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THE RELATIVE VALUE OF COLCHICUM ROOT.

BY THEODORE F. BECKERT, PH.G.

(*From an Inaugural Essay.*)

This subject was suggested by several pharmacists, who of late have found it a difficult matter to obtain colchicum root which on breaking presented a clear white color. The recently imported article, as obtained from the wholesale druggists, consisted of tubers which had been sliced very irregularly. Out of a one pound lot not less than seven whole tubers were taken, the remainder varying from one-sixth to one-half inch in thickness. These pieces, when broken, presented quite a varied appearance, their color being all shades between white and black; and it was noticed that the lighter colored roots were mostly easy to break, and many of them of a mealy character, whereas the darker ones were difficult to break, and had a somewhat resinous appearance. A quantity of the root was broken piece by piece, and then separated into three grades, according to color, white, slate-colored and brown or blackish, particular care being taken in the sorting. Upon weighing, it was found that the white root constituted only one-sixth, while the gray root comprised not quite two-sixths, and the black root a little over three-sixths of the article examined. These results also agree with the observations of several resident pharmacists.

The methods used to determine were as follows: Two troyounces of each of the three grades of roots were exhausted by means of alcohol, yielding in each case about twelve fluidounces of tincture; these tinctures varied in color according to the grade of root used, that from the white root being lightest. This indicates the solubility in the alcohol of the foreign coloring matter present in the gray and black roots. In preparing these tinctures, care was taken to percolate them under as similar circumstances as possible.

The tinctures obtained were separately evaporated by means of a water bath, the residue was treated with distilled water, and poured upon a filter, in order to separate resinous matter; the filtrate was washed with slightly acidulated water until each filtrate measured 100 cc. Dilute sulphuric acid was used for acidulating the solutions, which were volumetrically tested with Mayer's solution, in quantities varying from 5 to 15 cc. In the preliminary experiments the solutions were variously diluted, and it was observed that the results were very considerably influenced thereby, an observation previously made by Dragendorff. To serve as a basis for comparison, the experiments were afterwards made with solutions of uniform strength, as stated above, partly without any other addition, and partly as recommended by Dragendorff, after the addition of a concentrated solution of chloride of sodium, to increase the distinctness of the reaction. The three grades of the root required for 1 cc. respectively ·0403, ·0414 and ·0462 of Mayer's solution.

Five troyounces of each of the roots were next exhausted by alcohol, percolation in each case being carried on until the liquid passed tasteless. The alcohol was evaporated, and the residues were treated with water, filtered and precipitated by a solution of tannin. These tannates of the white, gray and black roots, which, after having been dried, weighed respectively ·32, ·265 and ·27 gram, were decomposed by oxide of lead, and then treated with alcohol, in order to separate colchicia. The three alcoholic solutions were carefully evaporated to dryness, then placed over sulphuric acid for several days, and then their weight taken; the product from the gray root weighing ·115 gram, the black yielding ·104 gram, while the product from the white root was unfortunately lost.

I next obtained same colchicum root from Professor Maisch, which was not less than ten years old, it having been in his possession at least nine years. It had quite a handsome appearance, very little dark root being present, and in all respects was a much better looking article than that previously employed. Two troyounces of this root were treated as stated above, and an acid solution obtained, measuring 100 cc., and which, when treated with Mayer's test, in a similar manner as before, required ·0300 for the precipitation of 1 cc.

The various results thus obtained are more concisely presented in the following table:

	1st grade or white root.	2d grade or gray root.	3d grade or black root.	Very old root.
Mayer's solution necessary to precipitate 1 cc. of the solution, . .	·0403	·0414	·0492	·0300
Percentage of alkaloid in air-dry root,	·205	·210	·219	·152
Tannate precipitate obtained from five troyounces of root, . . .	·320	·265	·270	
Amount of crude colchicia obtained from the tannates, ...	lost.	·115	·104	

By the above table it will be seen that the results obtained with tannin and by Mayer's solution do not agree as to the amount of colchicia indicated. This may be due to the slight solubility in water of the tannate of colchicia, as noticed by Hübler and others, and to the varying amount of water used in the last experiments. But the results seem to indicate that it apparently matters little whether the root has a white, gray or black color, but that the *age* is of primary importance, and none but a fresh-looking root should be purchased; if this is done I think no fault can be found as to the quality of the preparations made from it.

COLCHICUM SEED.

By Nathan Rosenwasser, Ph.G.

(*From an Inaugural Essay.*

The author prepared the active principle of the seed, and found it to have a neutral reaction to test paper, and to be not precipitated from aqueous solutions or solutions acidulated with organic acids, by potassio-mercuric iodide, sodium phospho-tungstate, auric chloride, phosphomolybdic acid and solution of iodine,[1] all of which reagents afforded precipitates after the solution had been acidulated with a mineral or oxalic acid, or had been boiled for a few minutes with acetic acid; he argues from this that the principle is naturally neutral, and is converted into an alkaloid by the influences mentioned.[2] The neutral substance, colchicin, was with some difficulty obtainened in crystals by the slow

[1] Ludwig (1862) obtained a thick precipitate with auric chloride, readily soluble in excess, and Eberbach (1874) found the aqueous solution of his colchicia, which had a distinct alkaline reaction, to be precipitated by the three last reagents mentioned above.—Editor.

[2] *Colchicein* is formed under these circumstances, which combines with bases, but not with acids.—Editor.

evaporation, in deep vessels, of its solutions in fusel oil and benzol, and found to be insoluble in *pure* ether, carbon bisulphide and petroleum benzin.

It having been asserted that the active principle resided chiefly in the outer integuments of the seed, and that for this reason they could be almost completely exhausted without being ground, the author experimented with 5,000 grains of unbroken seeds, macerated them in diluted alcohol in a warm place for ten days, and washed them well with diluted alcohol; the tincture and washings were used for preparing colchicin by Carter's process ("Am. Jour. Phar.," 1858, p. 205), of which five grains was obtained. The same seeds afterwards crushed to an uniform powder yielded eleven grains colchicin. 5,000 grains of seeds of the same lot were ground, and yielded sixteen grains; and 14,000 grains of the same seeds, rolled and crushed, yielded forty-five grains of colchicin. It follows, therefore, that only less than one-third of the colchicin present can be exhausted from the unbroken seeds. In preparing colchicin, particularly in warm weather, it is found unnecessary to remove the fixed oil by filtration previous to precipitating the colchicin by tannin; it is better to collect the precipitate, dry it carefully by means of a water bath, and then exhaust the oil by gasolin. For the decomposition of the tannate, aluminium hydrate seems to possess decided advantages over ferric or plumbic hydrate, it serving at the same time as a decolorizing agent.

When distilling the alcohol from the tincture, the odor of the *ground* seed was distinctly recognized in the distillate, which turned milky upon the addition of water. On distilling a pound of the ground seeds with water, an aromatic distillate was obtained, but a volatile oil, which probably exists in minute quantity, could not be separated. The distillate was tested for alkaloids with a negative result.

Flückiger and Hanbury give 6·6 per cent. as the amount of fixed oil present in the seeds; the author obtained 14 drachms (8·4 per cent.) from 10,000 grains of the seeds. After purifying it by treatment with benzin and animal charcoal, it had a light-brown color and a bland taste. It was found to be readily saponifiable.

ON A NEW PROCESS FOR THE PREPARATION OF EXTRACTS WITHOUT HEAT.

BY PROFESSOR ALPHONSE HERRERA.

Since the progress of organic chemistry has made us acquainted with many proximate principles of plants and their various properties, the processes for most medicinal preparations have been considerably improved, and diverse apparatus and methods have been designed with the view of obtaining them in a more energetic form and of preventing the alteration of the proximate principles, as well as to secure greater economy and a more convenient form for their administration. Of all the medicinal preparations none have attracted more the attention of the pharmacists than the extracts, which offer the advantage of being conveniently administered, and, if well prepared, of representing in a small bulk the properties of the drugs. By the action of heat and air the organic principles are generally more or less altered, and hence in the ordinary way of preparing extracts, the active ingredients are more or less modified, or if volatile, evaporated, and the preparations do not fully represent the drug. To obviate this difficulty, it has been proposed to evaporate the liquids at a rather low temperature, and if possible excluded from contact with the air, and with these objects in view, ingenious apparatus and contrivances have been adopted: like evaporating in many capsules heated by steam, as in the process of Henry; or keeping the liquid continually in motion to promote the evaporation, as in the process of Bernard; or effecting the concentration in vacuo by means of special apparatus, constructed by Laurent, Granval, Berry and others.

I do not propose to discuss the advantages or disadvantages of the different methods proposed, for they are well known. It merely remains to state that the best results have been obtained by evaporation in vacuo, in which process the exclusion of air and the low heat prevent any great alteration of the soluble principles; but the high price of such an apparatus is a great obstacle to its general use.

For many years, sodium chloride and ice have been employed in Europe with the object of utilizing the property of water when freezing to separate the salts which are contained in solution. In 1862 Robinet presented to the Paris Academy of Medicine a memoir, in which he demonstrated the application of this behavior in the analysis of waters. Afterwards Mr. Ossian Henry has applied it to the concentration of

mineral waters for the purpose of facilitating its transportation. I have utilized the same property for the concentration of vegetable juices, and in general, of aqueous solutions of organic principles.

The results of my observations have satisfied me that, when the water partially congeals, the dissolved principles remain in solution in the mother liquors, and that two or three congelations are generally sufficient for obtaining the solutions concentrated enough to finish the extract by exposure upon plates to the heat of the sun or of a drying closet, heated to about 30°C. (86°F.) The extracts prepared by this method accurately represent the properties of the plants, and the principles which are changed by the influence of heat remain unaltered; even the volatile constituents are not dissipated, though most of the water be removed by freezing. Owing to the small cost of the necessary apparatus, it appears to me that my process for preparing extracts should be preferable even in those countries where ice is less readily obtainable than combustibles.

Extract of conium, prepared with unpurified juice by the process mentioned, has preserved the characteristic odor of conia, and by dissolving it in water I have obtained a solution exactly representing the juice of the plant in appearance and properties, and giving, when heated, an abundant coagulation, proving that even albumen had remained unaltered. 1750 grams of cow's milk, of 9° B., left, after three congelations, 750 grams of a liquid having a density of 14°, and by evaporation in the sun this left a dry extract of milk, which again formed that liquid on being dissolved in water. A number of other liquids, similarly treated, gave corresponding results, and it seems to me, therefore, that medicinal extracts are best prepared by congelation. It may be objected that the vegetable juices should be previously purified; but it should be remembered that coagulated albumen always encloses a considerable portion of the active principles, and that the heat necessary to effect the coagulation and the evaporation by means of a water bath is sufficient to change many principles; also, that the extracts thus prepared are sometimes inert or less active. The careful experiments made by Orfila and the clinical experience of others demonstrate that extracts prepared with unpurified juice are stronger.

The results of the experiments just mentioned will show that my process may be advantageously used for the preservation of vegetable juices, which are obtained by dissolving the extract in sufficient water

until the solution is of the same density as the natural juice. The method is also advantageous in the preparation of syrups in serving to properly concentrate the liquors from which the syrups are made.

For the extracts prepared from juices by the method indicated, the author proposes the designation of *opopycnols* (opopicnolées), derived from the two Greek words οπος, the juice, and πυκνοω, to condense.

In obtaining artificial extractive solutions, the process of infusion should be used, unless the active principles are sparingly soluble in water, in which case digestion or even decoction may be resorted to, but in whichever way obtained, the solutions are treated alike for preparing the extracts. Extract of rhatany, prepared by the process of congelation, dissolves completely in water, with a red color, and has a much more astringent taste, compared with the extract which was prepared with the utmost precaution by evaporation in a water bath. Similar comparisons were made with the extracts of catechu, aloes and others, and in all cases a very notable difference was observed, which is explained by the final evaporation in the proposed process being conducted by the heat of the sun or of the drying closet, which is insufficient to effect a change or to volatilize the volatile principles in any appreciable degree.

The apparatus employed by me is the so-called *sorbetière*;[1] for larger quantities the apparatus of Gougaud is preferable. The frigorific mixture is composed of ice and sodium chloride, or preferably of crystallized calcium chloride. After a large portion of the solution has congealed, the mass is enclosed in a cloth and subjected to pressure, the presscake of ice is broken and again pressed, to separate the mother liquor as completely as possible, and the congelation is repeated two or three times, with the precaution that it be not carried far enough to cause the precipitation of the sparingly soluble principles. The mother liquor is then put into shallow dishes and exposed to the heat of the sun or of a drying room, the temperature of which does not exceed 30°C. (86°F.) until the extract has attained the desired consistence.

In conclusion, it may be stated that the concentration of aqueous solutions by congelation appears to be preferable

1. For the preparation of aqueous extracts in general.

[1] Similar to the apparatus used here for making ice cream.—EDITOR.

2. For the preparation of syrups containing juices, in which case the concentration should be carried far enough that after mixing with the simple syrup the requisite density is obtained.

3 For the conservation of juices, and

4. For chemical analysis the process may be used with advantage.

FRACTIONAL NOTES.

By Hans M. Wilder.

Honey in Tinctures.—Tinct. cardam. comp. and Tinct. opii camph. both contain honey. Since the proportion is so small (1 : 20 and 1 : 16) that it cannot be of any moment, neither therapeutically nor as a flavoring agent, might the honey not be replaced by simple syrup?

Tincture Stoppers.—None of the least disagreeable things which we have to contend with (especially when we are in a hurry) is the loosening of glass stoppers which have become cemented (as it were) to the neck of the bottles. This can be entirely prevented by rubbing the stoppers with a piece of paraffin and giving them a turn in the neck of the bottle, so as to distribute a thin coating of paraffin all over. Two or three times a year this coating has to be renewed (at all events seldom enough not to occasion any trouble). Paraffin may practically be considered insoluble in the different menstrua of the tinctures.

Syrupus Giberti.—Having of late very often had to prepare it, and not finding the formula in American pharmaceutical journals, I herewith give it as communicated to me by the physician. 2 grains red iodide of mercury and 100 grains of iodide of potassium are dissolved in 2 fluidrachms of water, and simple syrup added up to 6 fluidounces. This is somewhat stronger than the original formula, which adds syrup up to 10 troyounces.

Hydrated Oxide of Iron.—The U. S. Pharmacopœia precipitates solution of tersulphate of iron with water of ammonia, and washes it on a muslin strainer, In cases of emergency, the Pharmacopœia permits only to press the precipitate as much as possible on a strainer. Having had to make it of late in three cases of arsenic poisoning, I found the procedure of the German Pharmacopœia quicker and easier. Sixty parts solution of tersulphate of iron is mixed with 120 parts of

of water, and precipitated by a mixture of seven parts calcined magnesia and 120 water. Shake well together and dispense. In arsenic poisoning, certainly no objection can be found against the presence of sulphate of magnesia.

Copaiva in Pills.—The U. S. Pharmacopœia makes a pill mass by adding one drachm calcined magnesia to two troyounces copaiva, which mixture after several hours becomes solid enough to be made into pills. Unhappily these pills are so seldom prescribed that few apothecaries keep them ready made, and have to make them when called for. By using as much calcined magnesia as balsam of copaiva, a mass will be obtained which has sufficient consistence to enable it to be rolled out at once. (The addition of one drop of water to each drachm of balsam facilitates the solidification.) If it is found desirable to prevent these pills from becoming stone-hard, Hager in his "Praxis" recommends the addition of beeswax: 200 copaiva, 20 beeswax, 10 calcined magnesia, 2 water. Pills, or rather boles, of copaiva and cubebs are often prescribed by the German physicians. The German apothecaries have for many years kept ready on hand a mixture of 1 beeswax and 2 copaiva, of course taking a corresponding quantity of said mass (2 balsam = 3 mass) to make the boles.

Speaking of balsam of copaiba, I cannot forbear mentioning that I have lately had to make suppositories, *each to contain one drachm of the balsam* (no mistake!). By melting 3 parts of beeswax (in summer time) and adding 1 part of copaiva I got a plastic mass, none too hard; it is true each suppository was about two inches in height and one inch broad at the base, and it is needless to say that the (male) patient did not feel at all comfortable.

Lycopodium in Mixtures.—In order to make lycopodium miscible with water it becomes necessary first to rub it dry under strong pressure (to powder it, as it were) before adding the water. A little alcohol (1 : 16) much facilitates the rubbing, and dispenses with the extra pressure. The lycopodium has to be rubbed until it forms a granulous mass.

Volatile Liniment.—In one of the earlier volumes of the "Pharmacist," R. Rother recommends the addition of a little oleic acid to the liniment of the Pharmacopœia. This is a good idea; it prevents the separation, so familiar to all, keeps it from solidifying, and makes it

quite white. By the use of oleic acid it matters not what kind of oil is taken; 6 to 10 drops to the pint of liniment is sufficient.

FORMULAS and PREPARATIONS of new MEDICAMENTS.

By the Editor.

(Continued from page 351.)

Ferrocyanhydrate of Quinia.—Four parts of quinia sulphate and enough distilled water to form a not too thick mixture are mixed with a concentrated solution of one part of ferrocyanide of potassium, the whole is heated to boiling for a few seconds, and then allowed to cool. The mother liquor, from which more of the salt is obtained on concentration, is poured off from the resin-like mass, the latter washed with hot water and crystallized from boiling alcohol. It is in small yellowish needles, bitter, slightly soluble in water, freely in alcohol, and efflorescent in the air.

Bromhydrates of Quinia.—The *basic* salt is obtained by heating 10 grams of quinia sulphate with 80 grams of water to boiling, and adding 3·40 grams dry barium bromide, dissolved in 20 grams of water; the sulphate of barium is filtered off and the filtrate evaporated and crystallized. It forms silky needles, which require 60 parts of cold water for solution.

The *neutral* salt is made in a similar manner, except that the quinia is dissolved by the aid of just sufficient sulphuric acid, and 6·80 grams of barium bromide, dissolved in 25 grams of water, are used for decomposition; the mixture is heated to boiling, filtered, the filtrate evaporated to 35 grams, and crystallized. It crystallizes in handsome prisms, which are soluble in 7 parts of cold water, and freely soluble in alcohol and hot water. Both salts must be free from barium.

Tannate of Quinia.—To a neutral solution of quinia salt add a solution of gallotannic acid, free from resinous matter, until the white precipitate is redissolved; neutralize exactly with solution of bicarbonate of sodium, whereby the quinia tannate will be precipitated; collect upon a filter, drain, dry, powder and wash with distilled water; then dry again. It is a white amorphous powder, 3·5 parts of which correspond with 1 part of quinia sulphate; if prepared from the latter salt, it always retains a certain quantity of sulphuric acid.

Lactate of sodium is made by neutralizing lactic acid with sodium bicarbonate, and evaporating; it is very deliquescent.

Sulphovinate of Sodium.—1,000 grams of sulphuric acid are carefully, and with constant agitation, added to 1,000 grams of strong alcohol, and set aside for several hours; the liquid is then diluted with four liters of distilled water, neutralized with barium carbonate, and filtered from the precipitated barium sulphate. The filtrate is decomposed by a solution of sodium carbonate, and the filtrate concentrated in a water bath and set aside to crystallize; if necessary, the crystals are purified by recrystallization from water, and when dry preserved in well stopped bottles. The yield is about 1,000 grams. The salt forms hexagonal tables, which are very soluble in alcohol and water, have a scarcely bitterish taste, and when heated to 120°C. (248°F.) liberate alcohol. Its aqueous solution is not precipitated by barium chloride or by potassium sulphate.

Syrup of Hypophosphite of Sodium.—Dissolve 5 grams of the salt in 445 grams of simple syrup, and add 50 grams of orange flower syrup. A tablespoonful weighing 20 grams contains 0·20 grams (3 grains) of sodium hypophosphite.

GLEANINGS FROM THE FOREIGN JOURNALS.

By the Editor.

The fixed oil of stavesacre is described by Balmanno Squire as colorless and inodorous; an ointment made from it was found equally efficacious in scabies as sulphur ointment, and by far less irritating.—*Phar. Jour. and Trans.*, June 23; *Brit. Med. Jour.*

Preservation of powdered Ergot.—Mourrut recommends to mix the freshly powdered ergot with 5 per cent of powdered benzoin, whereby it will preserve its physical and medicinal properties without alteration.—*Rép. de Phar.*, May 10; *Jour de thérap.*

Method for Gelatinizing Carbonbisulphide, Petroleum Benzin, etc.—Mercier has observed that fixed oils, more particularly the drying oils, when mixed with a small quantity of protochloride of sulphur, form a solid transparent mass, having nearly the elasticity of caoutchouc. If at the moment of mixing, a volatile liquid, soluble in the oil, be added, the solid mass will retain that liquid. Less than 10 per

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cent. of the sulphur chloride should be used to obtain a glue-like non-pulverizable mass, which will retain 70 per cent. of carbonbisulphide; but by increasing the chloride the mass will assume the aspect of horn and be so friable as to be easily reduced to powder by rubbing between the fingers, while at the same time the largest portion of the volatile liquid is given off. Boiled linseed oil is best adapted for these purposes.—*Rép. de Phar.*, May 15, p. 294.

Glycerite of Phosphorus.—Chas. Ménière recommends to mix some sugar or gum arabic with sufficient glycerin to obtain a mixture of the consistence of honey; this is heated to 43°C. (110°F.), when 0·10 gram phosphorus is dropped in and finely divided with the aid of a pestle. Enough glycerin to make 1,000 grams is then added in small quantities, the heat of the water bath being kept at about 50° C. (122°F.); the turbid mixture gradually becomes clear, is then set aside for 24 hours, filtered and bottled.—*Ibid.*, June 25, p. 354.

Solubility of Sulphur in Acetic Acid.—Leo Liebermann has observed that concentrated or somewhat diluted acetic acid will dissolve appreciable quantities of sulphur, which are separated again as a milky precipitate on the addition of water, or in the form of long prisms if evaporated under an air pump.—*Ber. Chem. Ges.*, 1877, p. 866.

Products of the Distillation of Wood at a low Temperature.—On the dry distillation of wood at a temperature below 200°C. a product is obtained, which on rectification yields a heavy oil, but slightly soluble in water. H. B. Heill obtained a quantity of this oil from Dr. Squibb and found it to contain *furfurol*, a yellow body yielding pyroxanthin on being treated with caustic soda, some *pyromucic acid*, an *oil* having the odor of smoked fishes, and other products not yet examined, *Ibid.*, p. 937.

Aeterpen (see "Am. Jour. Phar.," 1876, p. 411), discovered by Meyer and Spitzer, has not the composition $C_{12}H_{20}$, as previously announced, but is $C_{10}H_{16}$.—*Ibid.*, p. 990 and 1034.

Liquor ferri acetici, Ph. Germ., is prepared by precipitating with ammonia 10 parts of solution of ferric sulphate, sp. gr. 1·318. The washing and expression of this precipitate is a very tedious operation; G. Mankiewicz therefore recommends to collect it upon a strainer and expose it to a temperature of 5°C. (23°F.) for about 24 hours, until it is completely frozen; it is then taken into a room and allowed to

thaw gradually at the ordinary temperature, and the water to run off. The ferric hydrate thus obtained is readily soluble in 6 parts of cold acetic acid, sp. gr. 10·40. The solution usually has a density of 1.150, and must be diluted with distilled water to obtain it of the required specific gravity, 1·134 to 1·138.—*Arch. der Phar.*, June, 1877, p. 510.

Administration of Castor Oil, Copaiba, etc.—Limousin proposes to use wafer capsules for the purpose. Two wafers are united, except on one portion of the rim, through which opening the liquid is introduced by means of a pipette; or the oil is placed upon one wafer, its viscosity preventing its spreading to the margin before the other wafer is rapidly affixed in the usual manner. The substance of the wafer is soon saturated by the oil, and is then less readily softened by water, while the finely divided oil is apt to turn rancid; wafer capsules filled with castor oil should therefore not be kept on hand, except for a short time. Codliver oil will communicate its odor to the capsule, and is, therefore, not adapted, unless the inner surface of the wafer be first covered with collodion, in which case it becomes less readily disintegrated.—*Rép. de Phar.*, May 10.

Canada Balsam as an Excipient for Pills.—To prevent pills from becoming too hard and insoluble, Dannecy proposes a mixture of one part of wax and three parts of Canada balsam, which has also the advantage of being well adapted for deliquescent substances, like potassium acetate, which are well preserved thereby for an indefinite period. —*L'Union phar.*, p. 168.

Preparation of Iodic Acid.—When this acid is prepared by passing chlorine into water containing suspended iodine, 20 parts of water to 1 of iodine must be taken, in order to transform all the iodine into acid; otherwise chloride of iodine is formed.—*Jour. Chem. Soc.*, March.

Boettger's test for sugar in urine has been modified by Professor Brücke as follows: The urine is slightly acidulated with muriatic acid, and an acidulated solution of bismuth-potassium iodide added, whereby all traces of sulphide are removed; the clear filtrate is then rendered alkaline by strong potassa solution and boiled for a few minutes, when the presence of sugar will be indicated by a gray or black coloration.—*Phar. Cent. Halle*, No. 24, from *Jahresber. phys. Ver. Frankf.*

Testing Beeswax for Resin.—E. Schmidt recommends a modification of Donath's method (1872), as follows: Five grams of the wax

are heated in a flask with 20 to 25 grams of crude nitric acid, sp. gr. 1·32, and boiled for one miuute. An equal volume of cold water is now added, and, with constant agitation, an excess of ammonia; the liquid is separated from the wax, and poured into a glass cylinder; it has a yellow color if the wax was pure, and a more or less intense red brown if resin was present. One per cent. of the latter may thus be readily detected, particularly if the resulting color is compared with that produced by pure wax. Nitric acid acts much more energetically upon resin than upon wax.—*Ber. Chem. Ges.*, 1877, p. 837.

Assay of Cacao and Chocolate.—E. Heintz concludes from his experiments that cacao dried at 25°C. (77°F.) should yield not over three or four per cent. ashes (Surinam cacao 1·8 per cent., Caracas 4 per cent.); if partly deprived of the fat, it still retains 27 to 37 per cent. of it, and should yield not over 4 to 5·5 per cent., pure chocolate not over 1·5 or 1·7 per cent. of ash. Cacao shells yield 8·5 to 18·5 per cent. of ash, and if used for adulterating cacao or chocolate, their ash will be increased in amount.

Twenty grams of the chocolate or cacao are exhausted with benzin and the solution evaporated; the residue is fat, the purity of which is ascertained by ether (or petroleum benzin—see May No., p. 238). The undissolved portion is six times treated with water of 15°C. (59°F.), and the moist residue examined by the microscope, by which foreign starches and the spiral vessels and dark-red cells of cacao shells are easily detected. The residue is washed with strong alcohol (the filtrate must not be deeply colored), dried and weighed. The weight deducted from 20 grams, less the weight of fat, indicates the sugar present, from which, however, 4 per cent. should be deducted, which is the average amount of cacao constituents which are soluble in water.—*Arch. d. Phar.*, June, 1877, p. 506–510.

Paullinia pinnata, Lin., is a tree indigenous to South America and the Antilles, and is known as *timbo*. The yellowish-gray bark of the root has an agreeable musk-like odor and is used in the form of poultice in some liver affections. Stanislas Martin has analyzed it, and found tannin, starch, resin, volatile oil and an alkaloid, *timbotina*, the sulphate of which crystallizes in white needles.—*Bull. gen. de Thérap.*

The Alkaloids of Calabar Bean.—Harnack and Witkowsky have recently investigated this subject in the pharmacological laboratory

at Strassburg, and ascertained that calabar bean contains two alkaloids, one of which acts like strychnia, while the second, heretofore known as *physostigmia*, has a paralysing effect. The new alkaloid which they have named *calabarina*, is insoluble in ether, soluble in alcohol and more freely soluble in water than the former; its precipitate with mercuro-potassium iodide is insoluble in alcohol. The calabar preparations of commerce are often mixtures of the two alkaloids in varying proportions, hence their effect must vary considerably; an English preparation was found to be almost free from physostigmia, while Duquesnel's *eserin* appears not to contain any calabarina. Physostigmia has a tendency to change into Duquesnel's *rubreserin*, particularly under the influence of alkalies; the latter body, however, is insoluble in ether; an etherial extract seems, therefore, preferable to one made with alcohol. O. Hesse, however, denies this, since physostigmia in its natural combination is nearly insoluble in ether.

O. Hesse refers also to the difficulty of recognizing the purity of physostigmia, which is amorphous even if obtained by Vée's process (1865); what the latter regarded as crystallized eserina was most likely a body similar to cholesterin, still containing some alkaloid. Hesse has recently isolated this body and found it to crystallize from ether, chloroform and petroleum ether in white silky needles, which are indifferent, and fuse at about 133°C.—*Schweiz. Wochenschr.*, No. 22, from *Phar. Zeitung.*

Preparation of Caffeina.—P. Cazeneuve and O. Caillot macerate 1 part of cut black tea with 4 parts of boiling water until the leaves are soft; 1 part of slaked lime is then added and the mixture dried in a water bath. The residue is rubbed to a coarse powder, exhausted with chloroform, the solvent recovered by distillation, and the greenish residue treated with boiling water; the solution is passed through a moistened filter and the clear liquid evaporated and crystallized.—*Phar. Centralb.*, No. 23, from *Bull. Soc. Phar.*

Veratria.—E. Schmidt boiled 5 kilos coarsely powdered sabadilla seed with water containing 300 grams sulphuric acid, and repeated the operation with a somewhat smaller quantity; the large excess of acid prevents the liquid from becoming too mucilaginous. The filtrate was treated at the boiling temperature with an excess of ammonia, and the precipitate well washed with water, dried and treated with ether. The

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etherial solution was evaporated, the residue dissolved in dilute hydrochloric acid, the solution filtered and while boiling, again precipitated by ammonia; by washing the precipitate with boiling water, again disdolving in acid and treating as before, it was obtained pure; the yield was 50 to 56 grams. It was obtained crystallized by Merck's method ("Am. Jour. Pharm.," 1856, p. 134), and its composition found to be $C_{32}H_{50}NO_9$, the analytical results as to C and H agreeing with those of Merck and Weigelin, and also with the nitrogen found by the latter. The formula was verified by the analysis of several salts and double salts.

The author coincides with Weigelin in assuming the existence of two modifications of veratria, one insoluble, the other soluble in cold water, but the latter is readily converted into the insoluble form by boiling, and partly also by ammonia. When separated by ammonia in the presence of some ammonium chloride and from a solution of a certain concentration, veratria is obtained as fine needles, which are strongly iridescent in the sunlight. The resinous mass obtained by Merck's method from making crystallized veratria is the same alkaloid, but amorphous, soluble in diluted alcohol, and after washing with cold water, insoluble in that liquid.

A number of commercial samples were examined by the author and found to be pure veratria, completely soluble in ether and except minute traces insoluble in boiling water; they were, therefore, free from sabadillia and sabatrina.—*Arch. de Phar.*, June, 1877, p. 511-532.

The Crystalloids and Colloids of Honey.—By subjecting filtered honey to dialysis in a parchment dialysator, E. Dietrich found that the surrounding water had acquired a pale yellowish color, and, on evaporation, yielded 50 per cent. of crystalloids in the form of a clear little-colored golden yellow honey, which did not crystallize from alcohol, but had such a fine taste and floral odor as the author had never before observed in honey. The colloids remaining in the dialysator contained slimy floccules, were destitute of honey-like odor and had an insipid sweetish taste. If the loss by colloids was not so great, the author would recommend the purification of honey by dialysis.—*Chem. Centralblatt*, No. 20, from *Ind.*, *Bl.*

Glycyrrhizin.—J. Habermann has recrystallized commercial glycyrrhizin, prepared by Trommsdorff, from glacial acetic acid, and ob-

tained it in hemispherical aggregations of microscopical needles, which are very easily soluble in water, also in strong but less in absolute alcohol, nearly insoluble in ether, and have an intensely sweet afterwards somewhat acrid taste. Alcoholic solutions of it are precipitated by calcium chloride and lead acetate. Boiled with very dilute sulphuric acid, a fawn-colored resinous precipitate was obtained, which had the characteristic sweet taste of glycyrrhizin. In this respect, and in the analysis, which differed to the amount of several per cent. of carbon, the author's results do not agree with those obtained by Gorup-Besanez in 1861.—*Chem. Central Blatt*, No. 18, from *Wiener Sitz. Ber.—Ber. Chem. Ges.*, 1877, p. 870.

Notes on the Saponin of Sarsaparilla.—In an interesting paper, published in "Archiv d. Phar.," June, 1877, p. 532–548, Prof. Flückiger reviews the chemical history of *parillin*, and recommends its preparation by exhausting the crushed root with warm alcohol, and distilling the tincture until the residue weighs one-sixth of the root. It is then gradually mixed with one-and-a-half times its weight of water, and after several days the liquid is decanted from the light-yellow precipitate, which is then mixed with about half its volume of alcohol, transferred to a filter and washed with alcohol of 20 or 30 per cent. Parillin is less soluble in weak than in strong alcohol or water. It dissolves very slightly in cold, but readily in hot water, without crystallizing on cooling; from boiling alcohol, sp. gr. 0·970, it crystallizes in needles. The yield was 0·18 and 0·19 per cent.

Concentrated sulphuric acid yields a yellow solution, which, on absorbing moisture, gradually turns cherry-red; warm diluted sulphuric acid colors parillin greenish, then red, and finally brown; phosphoric acid has a similar reaction, but the color is more green-yellow. The aqueous solution is precipitated by alcoholic solution of lead acetate, by lead subacetate and by tannin, and when warmed reduces alkaline copper tartrate, but does not react with other tests for sugar until after it has been boiled with a dilute acid, when the solution acquires a green fluorescence. This is best observed if a trace of parillin is dissolved in warm concentrated sulphuric acid, and disappears on dilution with water or on neutralizing with ammonia. The decomposition product, *parigenin*, is insoluble in water, the sugar appears to be partly crystallizable. Parillin is not sternutatory; its acrid taste is best observed in alcoholic solution.

The author compares the properties and analytical results of the above, and other similar bodies like saponin, senegin, cyclamin, digitonin, which are possibly homologous compounds.

VEGETABLE PARCHMENT AND ITS USES.

The history of invention bristles with illustrations of the statement that latent possibilities of eminent utility are hidden away beneath the most unpromising exteriors, demanding only the magic probe of the investigator to disclose themselves in quarters where they are least expected.

Who, for example, would have anticipated that a simple and almost instantaneous treatment with one of the most ordinary chemical agents was all that was required to altogether change the appearance and nature of unsized paper, and transform it from its normal state, in which it possesses but trifling tenacity, into a substance bearing the closest resemblance, both in appearance and characteristics, to parchment? Such is, nevertheless, the fact. By one of the simplest manipulations, the mere momentary immersion of the paper into strong sulphuric acid, and afterwards washing it thoroughly with water, this curious metamorphosis is brought about. This observation, made in England by W. E. Gaine, 1857, has originated[1] what is now a thriving industry—the manufacture of parchment paper (or vegetable parchment)—and the product has come to be almost indispensable for a great variety of general uses, as well as in technical and pharmaceutical chemistry, inasmuch as it affords an admirable substitute for the ordinary parchment and other animal membranes, while in point of cleanliness and cheapness it surpasses them. Plunged into water, it becomes soft and pliable. It is not injuriously affected by boiling water, regaining its original condition upon drying. It is quite impervious to water, alcoholic and ethereal fluids, benzol and numerous other substances, and consequently is largely used to replace the animal membrane in sealing vessels containing them. It was introduced with marked success during the late Franco-Prussian war as a substitute for animal bladder, in the preparation of the well-known pea sausage, which formed so note-

[1] In a report by De la Rue (1859) the honor of the scientific discovery in 1847 is given to J. A. Pommarede and L. Figuier, but the perfection of the process is W. E. Gaine's work.—EDITOR AM. JOUR. PHAR.

worthy a portion of the rations of the German soldiery. It has been recommended as a substitute for rubber for numerous purposes in hospitals, etc.

It has been found to perfectly answer the purpose of parchment in the process of separating mixtures of various substances by the method of analysis known as dialysis, a method devised by the English chemist Graham, for the separation of crystallizable from amorphous substances. This analytical method has come to be recognized as of the greatest importance. It was formerly a matter of the greatest difficulty to effect the perfect separation of many of the crystallizable substances of the vegetable kingdom (many of which are indispensable in medicine) from the gummy and other amorphous substances naturally associated with them, as the presence of the latter obstinately hinders the operation. It is only necessary now to bring the vegetable decoction upon a diaphragm of parchment paper, and to float the same upon a surface of distilled water, when the crystallizable materials present will find their way through the diaphragm into the water, while the amorphous ingredients are retained above, being unable to pass the membrane.

By this simple means the rapid and perfect separation of these two classes of substances is rendered possible, and the pharmaceutical chemist is provided with an apparatus of incalculable value. It is obvious, without entering into additional particulars, that the value of the dialytical method is not confined to the preparation of pure crystallizable substances of animal or vegetable nature, but that its utility extends in other directions. So, for example, it has been employed with great success in medico-legal examinations for the detection of cases of supposed poisoning, the dialyser affording a simple and rapid means of separating the crystallizable arsenic salts and the like from the mass of organic matter. It is only of late that the admirable qualities of parchment paper have begun to attract attention, and we may safely predict that its utility has by no means been yet exhausted.—*Polytech. Review*, No. 22.

JAPAN VEGETABLE WAX.

The most important article in Japan for illuminating purposes is the candle made of vegetable wax, which is mostly composed of palmitin. It is produced from the fruit of several trees belonging to the genus Rhus, amongst which the *Rhus succedanea* is the most important, and is

grown amongst vegetables, more or less extensively, almost everywhere in Japan, especially in the western provinces, from the south northwards to the thirty-fifth degree. The lacquerine (*R. vernicifera*) also yields wax, and differs in appearance but little from the wax tree; its geographical limit extends further northward, being at the thirty-eighth degree. Finally, the *Rhus sylvestris*, or wild wax, should be mentioned. The cultivated wax tree was originally imported from the Loo Choo Islands, but the growers of the tree now distinguish seven different varities. The tree grows in great abundance on the mountainous declivities of the province of Kinas, and in Higo, Hizen, Simabara, Chikugo and Chekugen. The fields are hedged in with it. The berries, which ripen in October and November, are of the size of a small pea and united in bunches, contain the wax between the kernel and the outer skin. When gathered they are exposed to the sun for a few days and then stored in straw. When they have attained their proper maturity, they are freed from stems by threshing with flails of bamboo. They are crushed, winnowed, steamed, placed in hemp cloth bags, steamed again, and afterwards pressed in a wooden wedge press, all by hand. In order to facilitate the flow of the wax, a small percentage of "Ye no abura" (oil from *Perilla ocimoides*, Lin.) is added. The raw product forms upon cooling a coarse, greenish, tallowy mass, which is placed in an earthen vessel with water and ashes. The yield is about fifteen per cent. of the berries used.[1] The wax is reduced to small scraps by means of a kind of planing tool, then washed and bleached by the sun and air, whereupon it assumes a pure white color. In ordinary candle-making the unbleached wax is used, and the manufacturing is done by repeated dipping and rolling on the flat of the hand, in order to smooth and harden the successive coatings. The wicks are made by rolling a narrow strip of Japanese paper in a spiral line around the upper part of a pointed stick, and twisting it at the upper end so as to prevent its getting loose. Two or three strings of the pith of *Juncus effusus* are then rolled around this paper in close spiral lines, and fastened with a few fibres of silk waste, so that the wicks can be taken off from the sticks and sold in bundles to the candle-maker. The latter places the wicks again on sticks, takes half a dozen of them in his right hand, dips the wicks into the melted wax, and rolls them upon

[1] Arch Phar., April, 1876, p. 374.

the palm of the left hand, repeating these operations till the candles have grown to the proper size. For the outside coating occasionally white wax is used. These candles are made of all dimensions; for ceremonies and similar occasions candles of bleached wax are employed of a fanciful shape and painted with bright colors. The art of candle-making is said to have been introduced from Loo Choo towards the end of the sixteenth century. Before this time pieces of resinous wood or paper dipped into oil was used.[1] The exports of Japan wax in 1874 from Hiogo and Osaka were 7,410 piculs; in 1875, 10,056. Prices ranged in 1875 between 11½ and 8½ dollars per picul. The consumption has greatly fallen off in London within the last few years, owing to previous high cost of the article, which induced buyers to substitute paraffin and other cheaper materials, and even the above low prices have not left a profit to shippers. The wax is now generally prepared in large square blocks or cakes of 133 lbs. in place of the old saucer-shaped cakes of from 4 to 4½ inches in diameter and one inch thick, by which a saving in freight is effected. The value of the wax shipped from Hiogo in 1875 was 93,277 dollars; from Osaka 955 piculs, valued at 8,986 dollars. The value of the total exports from Japan were 215,642 dollars in 1874, and 186,244 dollars in 1875. Of vegetable tallow there was exported from Kin Kiang in China in 1875, 2,747 piculs.[2] Of insect white wax 12,560 piculs, valued at £183,525 were shipped from Hankow in 1875.—*Jour. of App. Sci*, April 2, 1877.

CHEMISTRY of the Barks of the OAK, WILLOW and ELM.

By E. Johansen.

The investigation was undertaken with the view of ascertaining the nature of the different tannin-like substances contained in the barks of the oak, willow and elm, and it was hoped, by isolating these and carefully examining their properties and the nature of their principal compounds, to ascertain whether they were analogous or even identical. By a long and elaborate process, the different tannins were separated from the three barks in something like a pure state.

Oak Tannin is a red-brown amorphous glistening body, easily solu-

[1]Catalogue of the Japanese Section, Philadelphia.
[2]Consular Reports.

ble in alcohol, slightly soluble in ether, and forms an imperfectly clear solution in water. In its behavior to litmus paper, metallic salts, and alkaloids, it is completely analogous to gallotannic acid. Dried at 110°C., it lost 8·48 per cent. of water. On analysis, it gives 54·61 per cent. of carbon, 5·32 per cent. of hydrogen, and 40·07 per cent. of oxygen, agreeing approximately with Wagner's formula, $C_{14}H_{16}O_8$, which requires 53·85 per cent. of carbon, and 5·13 per cent. of hydrogen. It contains also 0·77 per cent. of nitrogen and 0·13 per cent. of ash.

Willow Tannin consists of a brown-red amorphous body, with a slightly astringent taste; easily soluble in alcohol, slightly soluble in ether, and forming a thick solution with water. With ferric salts it gives a deep black color, turned violet-red by alkalis. It precipitates mercuric nitrate and chloride, and zinc and copper sulphates, as well as albumin, starch and alkaloids. At 120° the willow tannin lost 10·10 per cent. of water, and on analysis gave 51·13 per cent. of carbon, 4·78 per cent. of hydrogen, and 44·09 per cent. of oxygen. It contains also 1·88 per cent. of nitrogen and 1·63 per cent. of ash. Another specimen, prepared in a different manner, though possessing the same reactions as the last, contained 51·26 per cent. of carbon and 5·99 per cent. of hydrogen, besides having independently 0·44 per cent. of nitrogen and 1·42 per cent. of ash.

Elm Tannin.—In appearance and solubility this variety resembles oak tannin. With ferric chloride, it gives a dirty-green precipitate, turned violet-red by sodium hydrate. With ferrous sulphate, it gives a pure green precipitate. It precipitates lead and copper acetates, and zinc suplhate after some time. With zinc chloride, mercuric nitrate, calcium acetate, etc., it gave the usual reactions. At 110° elm tannin loses 3·32 per cent. of water, and, on analysis, gives 44·54 per cent. of carbon, 4·72 per cent. of hydrogen, and 50·74 per cent. of oxygen, besides containing 1·21 per cent. of ash.

The salts of these three tannin acids (quercitannic, salitannic and ulmotannic) were next examined.

Lead Salts.—Quercitannate of lead is a chocolate-brown, amorphous mass, slightly soluble in water, insoluble in alcohol or ether. On heating it to 110°, it lost 9·66 per cent. of water; and on analysis it gave 22·85 per cent. of carbon, 1·47 per cent. of hydrogen, 9·14 per cent. of oxygen and 66·54 per cent. of lead oxide. The salitannate of lead resembled the last body, and on drying at 120° lost 4·50 per

cent. of water, and on analysis gave 22·53 per cent. of carbon, 1·35 per cent. of hydrogen, and 53·28 per cent. of lead oxide. By fractionally precipitating with a lead salt, both these acids gave salts of varying constitution. Ulmotannate of lead was greyer than the last body; and on analysis gave 21·36 per cent. of carbon, 1·51 per cent. of hydrogen, 10·32 per cent. of oxygen, and 66·81 per cent. of lead oxide.

Copper Salts.—Quercitannate of copper is a brown substance, insoluble in alcohol and ether, and sparingly soluble in water. At 110° it lost 12·23 per cent. of moisture, and on analysis gave 39·99 per cent. of carbon, 2·38 per cent. of hydrogen, 28·14 per cent. of oxygen, and 29·49 per cent. of copper oxide. Salitannate of copper forms a dark reddish-brown salt, which lost at 120° 12·4 per cent. of moisture; and on analysis gave 39·36 per cent. of carbon, 2·35 per cent. of hydrogen, 27·83 per cent. of oxygen, and 30·46 per cent. of copper oxide. Ulmotannate of copper is chocolate-brown, and after drying at 110° gave 39·68 per cent. of carbon, 1·93 per cent. of hydrogen, 17·98 per cent. of oxygen, and 40·41 per cent. of copper oxide

Tin Salts.—Quercitannate of tin is a greenish-brown substance, insoluble in alcohol and ether, and only sparingly soluble in water. At 110° it loses 5·98 per cent. of moisture, and on analysis gave 36·32 per cent. of carbon, 2·56 per cent. of hydrogen, 20·69 per cent. of oxygen, and 40·43 per cent. of stannous oxide. The formula $C_{30}H_{26}O_{13}.3SnO$ agrees fairly with these numbers. Salitannate of tin is a chocolate-colored body, which losses 7·18 per cent. of moisture at 120°, and on analysis gives 35·17 per cent. of carbon, 2·79 per cent. of hydrogen, 15·05 per cent. of oxygen, and 46·50 per cent. of stannous oxide. Ulmotannate of tin on drying 110° gave 38·99 per cent. of carbon, 2·40 per cent. of hydrogen, 13·66 per cent. of oxygen, and 44·95 percent. of stannous oxide.

When these different tannins were acted on by dilute acids in the usual manner, as Grabowski has already shown, the oak tannin yields an easily decomposed saccharide and a crystalline body. The amount of these bodies obtained varies with the strength of acid employed. On purification the saccharide is obtained as a brown substance, forming a dark-brown bitter syrup. Similar bodies were obtained from the willow tannin. On analysis the saccharide obtained from the willow tannin, gave 36·94 per cent. of carbon, 5·19 per cent. of hydrogen, and 57·87 per cent. of oxygen. Elm tannin, on the contrary, yields no

crystalline body, but only a saccharide resembling in every respect the last.

On fusing with potassium hydrate, the oak tannin yields, amongst other products, butyric acid amongst the volatile products, and protocatechuic acid from the residue. Willow tannin, similarly treated, yielded acetic and butyric acid amongst the volatile products, whilst the residue in the retort contained a body whose identity could not be satisfactorily made out. Elm tannin, treated in the same manner, yielded acetic and butyric acids among the volatile products, and oxyphenic acid in the residue.—*Jour. Chem. Soc.*, June, 1877, from *Arch. Phar.* [3], ix, 210—248.

MICRO-CHEMISTRY as APPLIED to the IDENTIFICATION of TEA LEAVES, and a NEW METHOD for the ESTIMATION of THEINA.

By A. Wynter Blyth, F.C.S.

I have been lately examining tea leaves, with a view of obtaining some chemical test, either peculiar to them or, at all events, restricted to the thein-producing plants. The result of my experiments has been the establishment of a process of great simplicity which will enable any one in a few minutes to pronounce whether the merest fragment of a plant belongs to the thein class or not. The procedure is based upon the well-ascertained fact that the alkaloid already alluded to is distributed in the woody tissue, the bark, the stem, the leaf, the flower, in short, in all parts of a thein plant, and this is the more especially true in the case of the various species of *Thea*. Now, this thein has some very characteristic properties; the most useful of these for my present purpose are, that it commences to sublime at the comparatively low temperature of 101° C.; that it sublimes from organic substances in a perfectly pure crystalline state; that the crystals have a very definite, easily recognizable form, and that a one-thousandth of a milligram is distinctly seen aud may be identified by the aid of the microscope. The details of the process I use are as follows:

(1.) The leaf or fragment, if it is desired to examine it subsequently by the microscope, is boiled in a very small quantity of water, say a cubic centimeter, and the little decoction is transferred to a watch glass, a minute quantity of calcined magnesia added, and the whole evapo-

rated nearly to dryness on the water-bath; the extract is next transferred to the surface of a thin circular disc of microscopic covering-glass, on this again is placed a thickish ring of glass, which is covered with a second circular disc of thin glass, the whole forming what I will call "the subliming cell"—the subliming cell is placed on the surface of an iron plate, which carries a cup of mercury in which is inserted a thermometer, and the plate is fitted in the ordinary way to a retort stand. This method of sublimation, in all its essential features, is identical with the one proposed and employed years ago by Dr. Guy. On heating the iron plate, first, moisture is given off and condenses on the cover of the subliming cell, and this cover may be removed and replaced by a second. In a very short time after it has become dry, a light mist is seen on the upper disc, and this mist the microscope resolves into beautifully distinct little crystals of thein; they may be identified as thein by re-subliming, when it will be found they will rise to the upper disc at about the temperature of 101° C. The subliming temperature of the extract itself is rather variable; the extract should be heated, if no mist or crystals become visible, up to as high as 220° C., and if still no crystals are obtained, the substance most certainly contains no thein. In all my experiments I have always obtained a sublimate from genuine products derived from tea or coffee below 200° C.

(2.) The substance is boiled and treated with magnesia as before, the solution cooled, a bit of dialysing parchment folded and cut into a miniature filter form, and placed in a glass tube, which, as very small quantities are being dealt with, need be no bigger than a thimble, or a porcelain crucible may be used, which being always at hand will, perhaps, be more convenient than anything else. The solution is then, by this little dialysing apparatus, which I need not further detail, dialyzed for twelve hours; a yellow coloring matter and thein are found in the outer liquid; a microscopic examination of this liquid, when evaporated down will readily discover crystals of thein. As in the former case, the fragments of the leaf or the leaf itself is uninjured, and can be put to any supplementary examination desired.

(3.) The leaf is boiled for a minute or two in a watch glass, with a very little water, a portion of magnesia equal in bulk is added, and the whole heated to boiling, and thus rapidly evaporated down to a good-sized drop; this drop, containing yellow coloring matter, magnesia and

thein, is poured on to one of the thin discs of glass already mentioned, and then evaporated nearly to dryness on the subliming plate. When it approaches dryness the "subliming cell" is completed by the circle of glass and cover, and in this way a sublimate is readily obtained. If the substance is derived from a thein-producing plant, a distinct sublimate of thein will be the result. The leaves, etc., of the tea plant also yield, without any preparation whatever, scanty sublimates of thein, and coffee gives up a very large proportion of the alkaloid, below 110° C., but, at all events, in the case of tea it is most certain to operate with magnesia as described. I may here remark that if a small quantity, say a gram, of finely powdered tea be placed between two watch glasses, and heated in the water bath in the usual way, on removing the upper glass, at the end of an hour or so, all round but within the edge crystals of thein can be discovered by the microscope. It is, then, evident that in the ordinary way of taking the hygroscopic moisture of tea there is some loss of thein; but this is, I think, too small to be regarded in mere technical processes. I should also add that the addition of magnesia to a decoction of tea or coffee for the purpose of dialysis is not absolutely essential, since thein (somewhat scantily) dialyzes without the addition of any reagent. The main objection to the processes I have given is their extreme delicacy; any speck of a tea leaf which is easily visible to the naked eye will yield its infinitesimal group of crystals to the cover of the subliming cell; hence, in the examination of a foreign leaf, any fragment of genuine tea mechanically adhering to it may give rise to error. It must, however, be borne in mind that a great many leaves in the vegetable kingdom will yield, by appropriate treatment, michrochemical evidence as definite as that of tea, and the time may come when a large proportion of minute vegetable products will be identified, not alone by the shape of their stomata, their epidermal appendages, or the structure of their ultimate vesicles, but by isolating their acids, their glucosides, or their alkaloids, and evolving a microscopical *corpus delicti* from a milligram of crude material.

Quantitative Determination of Theina.—Struck with the ease and purity with which theina sublimed, it was but natural that I should attempt to work out a quantitative method of sublimation. I believe I have been successful, and, according to my own repeated experiments, the process I give here is both quick and accurate.

A quantity not less than one gram or more than two grams of either tea or coffee, in its undried state, is as finely powdered as possible, and treated in a flask with 70 cc. of water; the flask is attached to a reversed Liebig's condenser, and the liquid boiled for one hour; the decoction, including the powdered substance, is transferred to a porcelain dish; about the same weight of calcined magnesia as the substance originally taken is added, and the whole evaporated down nearly to dryness; the powdery extract is now transferred to the iron subliming plate already spoken of, and covered with a tared glass funnel, the edge of which must be accurately ground, and the tube of which must be several inches long. The substance should form a very thin equal layer within the circle of the funnel, which may be easily accomplished by a series of gentle taps. The heat at first should not exceed 110° C., then, when the substance appears thoroughly dry, it may be gradually raised to 200° C., and towards the latter stages to 220° C. If the heating has been properly regulated, there will be no distillation of empyreumatic products, but the alkaloid sublimes, in the cool part of the funnel, in a compact coating, cone-shaped, of beautifully white silky crystals. In order to ascertain when the sublimation is complete, the tared funnel may be cooled and weighed at intervals, or a series of tared funnels may be kept on hand and changed until no more thein is extracted. The funnel as well as the thein, as may be expected, at the end of the process is perfectly dry, and the increase of weight is thein pure and simple. By the method described I have made numerous determinations of thein, and have afterwards digested the powder remaining, for twenty-four hours in ether, but have failed to obtain any crystalline product; I, therefore, believe that the whole of the alkaloid is sublimed, and that the results, with care, are accurate. From one to two grams may be considered by some too small a quantity for an accurate assay, and, if so, there is no reason why very much larger weights should not be used; indeed, the process is well adapted for working on a large scale, and if there ever should be any great demand for the alkaloid would probably be employed.

There is yet another micro-chemical test which belongs to pyrology, and that is the presence of manganese in the ash of tea. The ash of a single leaf will give a distinct green manganate of soda bead, and, unfortunately for our purposes, so will the ash of a great many other leaves; but since I have never found any tea leaf without manganese,

if it should happen that a leaf in tea would not respond to this test, I should consider it conclusive evidence of a foreign leaf.—*Jour. of App. Sci.*, July 2, 1877, from *The Analyst.*

MEMOIR ON THF PREPARATION AND COMPOSITION OF EMETINA.

By Jules Lefort and Frederic Würtz.[1]

Certain facts in the history of emetina recently published by M. Glénard do not tally with results which M. Lefort had previously obtained.

Imagining that this discordance was owing to the state of purity of the alkaloids, and hearing that M. Glénard intended to pursue the subject, it seemed to us that the time had come for the publication of a new process we had devised for the preparation of emetina in a state of absolute purity, and to finally establish its elementary composition. Judging *à priori*, from the known composition of the cinchonas and other vegetables, it is probable that emetina is not the only alkaloid contained in the ipecacuanhas. This seems to be also M. Glénard's idea; but although he has in a sense reserved this investigation for himself, we do not consider ourselves bound to neglect it uuder the unusually favorable circumstances in which we are placed by the courtesy of M. Dorvault, Director of the Pharmacie Centrale of France.

Preparation of Emetina.—M. Glénard has discovered that by treating powdered ipecacuanha-root first with lime and then with sulphuric ether, all the emetina contained therein is obtained in a comparatively pure state. When New Granada ipecacuanha is used, which contains less of the brown resin than the Brazilian, the alkaloid is specially white. The object of M. Glénard's first researches was to suggest the idea that the alkaloid so obtained might be contaminated with one or more bodies resembling it in solubility and other properties.

To clear up this point, and to provide for the industrial production of ementia in case it should be introduced into medicine, we undertook some experiments, and finally adopted the following method for its preparation: 500 grams of alcoholic extract of ipecacuanha are dissolved in half a liter of water. Cold saturated solution of potassic

[1] Abstract from the "Journal de Pharmacie."

nitrate is added until a precipitate ceases to fall, and the mixture is set aside for 24 hours.

The abundant blackish-brown pitchy deposit consists of nitrate of emetina and coloring matter. The precipitate is purified by washing three or four times with a small quantity of water, and will be found to weigh about 200 grams. The precipitate is dissolved in a little hot alcohol, and thrown into a thick milk of lime containing 200 grams of calcic hydrate.

The mixture is evaporated to dryness on a water bath with constant stirring, the mass powdered and placed in a flask containing sulphuric ether. After some hours the ethereal solution has a clear yellow color, and contains all the emetina. The residue is washed once or twice with ether, the solution mixed, and the ether recovered by distillation. The residue in the retort is a yellowish-brown syrup. It is treated with water acidulated with sulphuric acid, and, on filtering, a solution of sulphate of emetina, free from resin, is obtained. Ammonia causes in it a voluminous yellowish-white deposit of emetina, which is washed and dried at a low temperature. It may be obtained still purer by dissolving it again in ether and evaporating in a vacuum. This process is decidedly the best yet published.

The idea that emetina is uncrystallizable has arisen from the fact that impure specimens have been operated on. The authors have prepared crystals of it varying in size from that of a millet-seed to a small lentil, and composed of minute needles, radiating from a common center.

Composition of Emetina.—The result of several analyses of a material dried in a vacuum give the following figures:

C_{28}	69·41
N	5·78
H_{20}	8·16
O_5	16·65
	100·00

M. Glénard's formula is $C_{30}NH_{22}O_4$, but his analyses were made on a specimen dried at a temperature of 110° to 120°C., at which temperature emetina changes rapidly.—*Chem. and Drug.*, July 14, 1877.

NOTES ON THE DISTRIBUTION OF THE ALKALOIDS IN CINCHONA TREES.

BY DAVID HOWARD, F.C.S.

In the "Pharmaceutical Journal" of June 26, 1875, I called attention to the constant presence of quinidia in renewed bark of *Cinchona succirubra* and *C. officinalis*, and in the root bark of *C. officinalis* in much greater quantities than in the natural stem bark. Since that time I have had many opportunities of confirming those observations, the renewed bark of both species invariably showing a greatly increased percentage of this alkaloid. I find, however, that by very careful testing of considerable quantities of the alkaloid from *C. succirubra* it is possible to obtain quinidia in quantities from a minute trace to ·06 per cent. of the bark in that from Ootacamund, Darjeeling and Java.

Recent importations of the root bark of *C. succirubra* and *C. officinalis*, from Darjeeling, and of *C. succirubra*, *C. Ledgeriana* and *C. Hasskarliana*, from Java, have given an opportunity to extend our knowledge of root bark. The specimens from Darjeeling are of special value, as the root, stem and branch bark sent over together may safely be taken as representing the produce of the same trees, whereas we have no information as to which of the various parcels of stem bark sent from Java the small quantities of root bark sent with them belong.

In examining the root bark from Darjeeling we are at once struck by the high percentage of alkaloids, which is in all cases much greater than that given by the stem bark of the same trees, usually in the proportion of about 8 to 5, and by the great difference in the proportion of the different alkaloids in the stem and the root.

In all the specimens that I have examined of the *C. succirubra*, the great increase is in the dextrogyrate alkaloids, quinidia and cinchonia, and to a small extent in the slightly dextrogyrate amorphous alkaloid. The percentage of quinia and cinchonidia in the bark averages slightly less in the root than in the stem, but more than in the branches; but the total variation in these alkaloids between the stem and root of the same tree is much less than between different samples of either from different plantations; the percentage of cinchonia, on the other hand, seems invariably in the root bark from twice to three times as great as that in the stem bark, and that of quinidia is increased from the minute quantity I have mentioned to ·2 to ·3 per cent.

The increase of the amorphous alkaloids is much smaller, being usually in the proportion of 11 to 10.

A comparison with the quill bark from the smaller branches shows even more decidedly this difference in the distribution of alkaloids. Not only do we find the total quantity of alkaloids much less than in the stem bark, but the proportion of the dextrogyrate alkaloids is distinctly less. One example will suffice to illustrate these remarks as well as the whole series, which all present similar variations; and I therefore add the percentage of alkaloids in the branch, stem, and root bark from one plantation, and the percentage composition of the alkaloid of each.

The composition of the alkaloid in the root fibre shows, as will be noticed, an even higher percentage of quinidia than that of the root bark. It is impossible to separate the bark from the wood in these small roots, which are from the thickness of a quill to a mere fibre, and therefore impossible also to give the percentage of alkaloids in the bark without the woody portion.

	Branch.	Stem.	Root.	Root Fibres.
Total alkaloids	3·3	5·5	7·6	2·0
Composed of:—Quinia	23·5	20·2	11·5	13·0
Quinidia	·6	·6	2·9	11·4
Cinchonidia	25·3	23·6	19·9	11·7
Cinchonia	19·4	32·8	47·3	46·7
Amorphous	31·2	22·8	18·4	17·2

The crown bark from Darjeeling is interesting both in its resemblance to and difference from the red bark. This species has not flourished there; a large proportion of the trees died, and those that survived were stunted and weakly. The stem bark is of fair quality, though far inferior to that grown at Ootacamund, yielding 3 to 4 per cent. of alkaloid, of which 60 per cent. is quinia, with small quantities of quinidina and cinchonia. The root bark contains about twice as much total alkaloid, of which 50 per cent. is quinia, 9 per cent. quinidia, 9 per cent. cinchonidia, and 16 per cent. cinchonia; the increase in the quinidia and cinchonia being even more marked than in the case of the succiruba.

The root barks from Java which I have examined of the *Cinchona succirubra*, *C. Ledgeriania*, and *C. Hasskarliana*, all show the same tendency to the development of the dextrogyrate alkaloids. As has been mentioned, we are not informed what stem bark belongs to the root bark sent over; but it is interesting to observe that in each case the

root bark contains more of these alkaloids than any single specimen of stem bark of the same species, and greatly more than the average.

Thus, in the *C. Ledgeriana* the increase of alkaloid in the root is very slight, but the proportion of quinidia is doubled, and of cinchonia trebled, the amorphous alkaloid being also increased.

In the *Hasskarliana* the total alkaloid is decidedly increased, the proportionate increase of the dextrogyrate alkaloids being similar to that in the *Ledgeriana*. In both these species the quantity yielded of these alkaloids is but small, but the marked increase is not less interesting on that account. In the *C. succirubra*, also, the increased quantity of alkaloids in the root is chiefly cinchonia, the quinidia increasing from ·01 to ·05 per cent.

There has been no opportunity of comparing the root bark of the cinchonas from Ootacamund, for the great success which has attended the system of renewing the bark puts the destruction of the trees out of the question; but it is interesting to observe that the specimen of root bark from *C. officinalis* from this district, which I described in 1875, shows an increase in the dextrogyrate alkaloids equal to that in the *C. officinalis* from Darjeeling; there is also an increase in the quinia, but much less than in the Darjeeling bark.

A specimen of root and stem bark from the Wynaad district has reached me. In this case the total alkaloid is increased from 5·0 per cent. to 6·5 per cent., the quinia being diminished and the cinchonidia increased; but, as might be expected, the cinchonia is increased from 2·2 per cent. to 2·8 per cent., and the quinidia from a trace to ·3 per cent.

It seems, therefore, that there is an invariable tendency in the bark of the root of the various species of cinchona to produce the dextrogyrate alkaloids in greatly increased proportions, and this is the more noteworthy as the production of the lævogyrate alkaloids in the root bark varies exceedingly, according to the species and habitat, being sometimes greater and sometimes less than that in the stem bark of the same trees.

The same tendency is shown in a much slighter degree by a comparison of the bark of the branches with that of the large stems, the proportion of the cinchonia and quinidia increasing as we approach the root more rapidly than that of the quinia and cinchonidia; but it is not till we reach the root that we see the sudden and well-marked change in proportion of the alkaloids that we have been considering.

The constitution of the alkaloids of the renewed bark affords curious points, both of resemblance and contrast to that of the root. There is seen in the renewed bark also an increased yield of alkaloids, but in this case the increase of the more oxidized alkaloids, quinia and its isomers, is accompanied by a distinct diminution of cinchonia and cinchonidia.

This is most evident in the *C. succirubra*, the proportion of quinia and cinchonidia being inverted by the process, while the slight diminution of the cinchonia is accompanied by an increase of the quinidia from ·03 per cent. to ·14 per cent., but the same change takes place in the bark of the *C. officinalis*, where the cinchonidia almost disappears, and the quinidia is markedly increased in quantity, the amorphous alkaloids being in each species increased by the process.

The renewing of the bark has only been carried on as yet on the Neilgherries, but it is to be hoped that the great commercial success which has attended the experiment will lead to its adoption, if practicable, elsewhere, when we shall see if the modification of the alkaloid follows the same rule under all circumstances.

The variations shown by *C. succirubra*, under the influence of climate and soil, are also very interesting. This species of cinchona alone seems to be sufficiently hardy to adapt itself to varied circumstances, growing alike at Darjeeling where the other species have proved almost total failures, in the Neilgherries where the climate seems the best suited for the *C. officinalis*, and in Java in the habitat so singularly favorable to the *C. Ledgeriana*.

The proportion of the alkaloids varies, however, very distinctly under these varied circumstances. Except under the artificial treatment of renewing the bark, it is never rich in quinia, but the cinchonidia and cinchonia show very interesting variations.

In Java the cinchonidia predominates in a most marked degree. On the Neilgherries, though cinchonidia is still predominant, cinchonia shows an increase. On the Himalayas the bark shows a diminished yield of cinchonidia, but a marked increase of cinchonia and amorphous alkaloid.

Not having been able to get particulars of the various elevations at which bark is grown in Ceylon, I cannot speak with certainty as to the different specimens obtained from that island, but as far as I can judge,

the bark from the lower elevations approximates nearly to that from Darjeeling, while the higher plantations give bark of similar characteristics to that from Ootacamund.

All these considerations point out the great care that should be exercised to choose suitable situations for cinchona plantations, as well as the importance of selecting the best species for cultivation. The experience of the plantations in Java shows that under the most favorable circumstances the wrong tree will not produce rich bark, and that of the Darjeeling plantations shows that the right tree in the wrong situation will either dwindle away or produce a distinctly inferior bark.

The result of cinchona cultivation at Darjeeling thus agrees with the experience earned in some districts of South America, somewhat similarly situated in too damp a climate, at too low an elevation. There also, instead of the calisaya and micrantha barks, rich in quinia, of the higher slopes, we find what are either degenerate varieties or different species, in which cinchonia, and, in some cases, quinidia, take the place of quinia.

A vast proportion of the "flat yellow bark" now imported is from these regions, and though certainly flat and yellow resembles in little else the flat calisaya bark of a few years back, and must certainly lead to disappointment if substituted in medicine for the true calisaya.—*Pharm. Journ. and Trans.*, July 7, 1877.

NOTES ON THE PERMANENT EXHIBITION.

By the Editor.

II.

Cinnamon in its various varieties is quite prominent among the collection of spices. They are derived from different species of Cinnamomum, all of which are indigenous to India, southeastern Asia and the adjacent islands. The finest and most esteemed variety is the Ceylon cinnamon, which is obtained from *Cinnamomum zeylanicum* Blum, chiefly as cultivated along the southwest coast of Ceylon. It is collected from shoots about 2 years old, the bark being deprived of its external layer by scraping it down to an almost uninterrupted circle of hard and thickened cells, after which several layers of the remaining bast tissue are dried together, forming a rather solid compound quill. It is of a light yellowish-brown color, smooth upon the outer and inner surface, and upon the former with faintly glossy lines. Similarly prepared is the true cinnamon, which is cultivated in Java and other tropical countries; but none is fully equal in flavor to that from Ceylon, though in appearance

they are not unfrequently quite as handsome. We have seen a bark from Nova Goa which was well scraped and had a pale yellowish-brown color, resembling Ceylon cinnamon, but being considerably thicker, a single bark only forming the quill.

Chinese cinnamon, or cinnamon cassia, is usually referred to *Cinn. aromaticum*, Nees; but it is possible that several varieties or closely allied species may produce the commercial article which always comes in simple quills or curved pieces, the bark being thicker and of a deeper color than the preceding, and has fragments of the corky layer remaining upon the outer surface; its taste is rather less sweet. Under the name of *Saigon cinnamon* we find on exhibition a bark which has been met with in our commerce for several years; it is in thicker and in pretty regular simple quills, which are not deprived of the brown grey corky layer and have a very sweet and warm cinnamon taste. This variety yields a darker powder than the ordinary China cinnamon, but has a superior flavor. Closely resembling this variety was a cinnamon exhibited from Dilly, in the Portuguese Colony of Timor; it was marked as coming from *Laurus cinnamomum*, which is possibly correct, since not only the flavor, but also the microscopic structure place it nearer to the Ceylon than to the Chinese cinnamon. Somewhat similar, but coarser and with thicker cork, was a cinnamon from Principe, on the coast of Guinea.

The term *Cassia lignea* is sometimes used for designating the ordinary Chinese cinnamon, sometimes only for the inferior varieties of it, and occasionally it is restricted to a thicker bark of a deep cinnamon-brown color and with a thin corky layer, which has been by some writers referred to *Cinn. tamala*, Nees; it has but a slight cinnamon flavor and is more mucilaginous. Of a similar character was a bark exhibited from Sao Thomé on the coast of Guinea.

Culilawan Bark, from *Cinn. culilawan*, Nees, is usually in flat or slightly curved pieces, which are often ¼ inch thick, though usually thinner, covered with a brownish-grey cork, otherwise dark cinnamon-brown, of a mucilaginous aromatic taste. and an odor which is cinnamon-like, with an admixture of cloves and sassafras. Though indiginous to the Moluccas, it is cultivated in other tropical countries, and has been exhibited as a product of the Philippine Islands.

All the barks mentioned yield the well-known oil of cinnamon, which as obtained from the different sources, is in the main chemically identical, though there is a vast difference in the delicacy of the flavor. The oil of culilawan bark, however, has little of the odor of cinnamon, but reminds more of oil of clove and cajaput. More cinnamon-like but less agreeable in odor and taste are the so-called *cassia buds*, the unripe fruit of some species of cinnamon, which have some resemblance to cloves and consist of a thick perianth, the six small lobes of which are folded over the depressed ovary. Another product of the genus cinnamonum are the leaves formerly known as *Folia malabathri*, which are collected from Cinn. Tamala and probably from other species. The volatile oil which is obtained from cinnamon leaves has a distinct odor of cloves, and when heated also of cinnamon; it appears to contain cinnamic and eugenic acids (see January number, p. 12), and therefore to be similar to a mixture of the oils of cinnamon and cloves.

Much more clove-like and with a slight flavor of cinnamon is the South American clove bark, obtained from *Dicypellium caryophyllatum*, Nees; it occurs in long

compound quills of a chestnut-brown color, usually tinged with purple, and is used in Brazil like cinnamon.

Under the name of *sassafras*, both Venezuela and Brazil exhibited the bark of *Ocotea* (*Nectandra*) *cymbarum* which has a peculiar aromatic odor and warm camphoraceous taste, not in the least resembling the stem or root bark of our sassafras, either in appearance or flavor, but is doubtless valuable as a stimulant.

All the plants referred to above belong to the natural order *Lauraceæ* which is particularly rich in warm aromatic volatile oils; but a limited number of its species occur in temperate countries, the large majority being confined to tropical and subtropical regions, where many are employed either medicinally or for dietetic purposes.

VARIETIES.

The Peruvian Nitre-Beds.—On the Pacific coast of South America, extending from the fourth to the fortieth degree of south latitude, about 2,400 miles along the slope of the Andes to the sea, in Bolivia, Peru and part of Chili, there has been found a line of deposits of sodium nitrate, the "Peruvian nitre." The beds are of variable thickness, covered by one to ten yards' depth of earth and half-formed sandstone. The dry soil of the most of this rainless country is pervaded, in some degree, with this deposit The mummied remains of the old Peruvian people are embalmed with it by the earth in which they were buried; and its crystals glisten on those ghastly relicts which were presented in the Peruvian department of the Centennial Exhibition, and those brought to this country by Dr. Steere. It has been estimated that in the province of Tarapaca, within fifty square leagues, the quantity of the nitre is not less than 63,000,000 tons. The appropriation of this vast resource has been taken up rather slowly, but has much increased for ten or twelve years past. Vessels laden with it go to the coasts of manufacturing countries. At Glasgow the works devoted to the production of ordinary saltpetre from the nitre of Peru extend over acres of ground. In 1868, 100,000,000 pound were used in Great Britain. As yet, it has been applied to the nourishment of crops only to a limited extent. But this seems to be its chief destination, and for this use it lies in the earth, a vast mine of wealth, for the disposal of coming generations. When multiplied population puts the sustaining power of the earth really to the test, this fund of sustenance on the Peruvian coast must come to outweigh in value the gold and silver mines of the Californian coast.—*Professor Albert B. Prescott, in Pop. Sci. Monthly for July.*

Potash and Soda in Organized Structures.—There remains to notice another representavive of the adequate resources, *potassium*. The statements made as to the supply of phosphorus, with some reservation, become true for potassium. Certain of the rocks contain a proportion of it, but from insolubility this is slowly

available, and is insufficient for the needs of higher organic life. The soils contain more, because the organic world has gleaned for the soil. Potassa and soda are two alkalies which replace each other in the laboratory at the convenience of the chemist, but, in the choosing of the living cell, one of these is always taken and the other left. We get potassa free from soda in the ash of a tree which grew in a soil having more soda than potassa. From sea-water, containing nearly 200 parts of soda to one of potassa, the sea-weeds furnish an ash having two to twenty times more potassa than soda. From the blood of man, having ten to fifteen times more soda than potassa, the muscles obtain a composition of six or seven times more potassa than soda.

This gleaning is good proof of the value of more, and the evidence is confirmed by the application of potassa as a fertilizer The stock of potassa—which is used somewhat in the arts—is derived mainly from the gatherings of the organic world. The ash-wagon takes up the savings of the hearth. In France the washings of sheep's wool are saved, and 160 pounds of good potassium carbonate are obtained from a ton of the wool. In the pioneer life of this country, the house-wives have burned corn-cobs and taken the ash for baking powder, eighty per cent. potassium carbonate, and preferable to the "dietetic salaratus" now used. Should the ash of the entire corn crops of the United States be taken without loss, it is estimated that over 100,000,000 pounds of potassium carbonate would be obtained. In the salt-beds at Stassfurt, Germany, there is a good proportion of potassa, and the use of this supply has been steadily increasing, both as material in manufactures and as a fertilizer.—A. B. Prescott. *Ibid.*

Lavœsium, a New Metal, named in honor of Lavoisier, has been discovered by M. Prat, in iron pyrites and other minerals. It is of a silvery white color, malleable and fusible. The solutions of its salts yield precipitates with ammonia, readily soluble in excess; rosecolored (like *roses du bengale*) with ferrocyanide of potassium; deep yellow-green with tannin; a brown coloration changing to a fawn-colored precipitate, with hydrosulphuric acid.—*Chem. News,* April 6.

Davyum, named in honor of Sir Humphrey Davy, is the name given to another new metal, the isolation of which has been announced by Sergius Kern. It has been found in platinum ore, and appears to occupy a place midway between molybdenum and ruthenium.—*Ibid.*, July 6.

Preparation of Pure Bismuth and Bismuth Compounds.—The usual impurities, even in what is sold as pure bismuth, are silver and iron. Quesneville's process, viz.: fusing the metal with nitre, has the disadvantage of being extremely wasteful, a large quantity of bismuth being oxidized. Nor can bismuth be separated from it by precipitation as oxychlorides with water, for iron is invariably a constituent of the precipitate. If the mixture be fused under a mixture of potassium chlo-

rate and a little sodium carbonate the iron is completely oxidised, while very little bismuth is lost; for the fused mass does not become alkaline as in the case where nitre is used as flux; 2 to 5 per cent. of sodium carbonate should be added, and the fusion should last for a quarter of an hour. No method of separating bismuth from iron by the wet method was successful, except by crystallizing the double chloride of bismuth and the alkalies, and by precipitating the bismuth from a slightly acid solution with oxalic acid. The bismuth oxylate, $Bi_2(C_2O_4)_3+15H_2O$ comes down absolutely free from iron. Too large an excess of oxalic acid should be avoided, for the oxalate is slightly soluble in the acid; the precipitate should not be allowed to stand too long in contact with water, else the basic oxalate is formed which retains the iron. The oxalate in ignition yields metallic bismuth.

This process has not been attempted quantitatively.

The only method of separating silver from bismuth is to oxidise the bismuth and leave metallic silver.

Bismuth is best precipitated as sulphide. The liquid is then warmed and the sulphide cakes together and may be easily filtered and washed. On ignition in air it is converted into bismuth oxide, and may be weighed as such.—Hans Thürach. *Jour. Chem. Soc.*, March, from *J. prakt. Chem.*

Aitificial Gold.—Take 100 parts (by weight) of pure copper, 14 parts zinc or tin, 6 parts magnesia, 3·6 parts sal-ammoniac, 1·8 parts quicklime, 9 parts cream of tartar. Melt the copper and add gradually the magnesia, sal-ammoniac, quicklime and cream of tartar, each by itself in the form of powder. Stir the whole for half an hour, add the zinc or tin in small pieces, and stir again till the whole is melted. Cover the crucible and keep the mixture in a molten condition for thirty-five minutes. Remove the dross and pour the metal into moulds. It has a fine grain, is malleable and does not easily tarnish.—*Jour. Frank. Ins.*, Aug., from *Phönix.*

Electro-chemical Deposition of Aluminium, Magnesium, Cadmium, Bismuth, Antimony and Palladium. By Arm. Bertrand.—*Aluminium* is deposited on a copper plate in granules from aluminium-ammonium chloride. The deposit may be polished. Chlorine is evolved at the positive pole.

Magnesium.—An adherent homogeneous deposit of magnesium may be obtained by electrolysing magnesium-ammonium chloride with a very powerful current.

Cadmium.—A spongy deposit of cadmium is obtained from its chloride, to which a few drops of sulphuric acid have been added. Cadmium-ammonium chloride gives a gray non adherent deposit, chlorine being evolved; a similar deposit was obtained from cadmium calcium chloride; cadmium bromide acidulated with weak sulphuric acid gives a coherent mass, susceptible of polish. If an iron wire be used as a negative, and a copper wire as positive electrode, the cadmium is deposited in long brilliant needles. A good result is also obtained with acidified cadmium-ammonium bromide. Cadmium-ammonium iodide yields a spongy mass. The sulphate gives a coherent deposit, capable of receiving a fine polish. A non-coherent deposit was obtained from the double sulphate of cadmium and ammonium.

Bismuth.—Ammonium chloride is the best solution from which to obtain an adherent deposit. The solution should contain 25 to 30 grams per liter, and should be cold. With a single Daniell's cell, the deposit takes place slowly and to a small extent; with a Bunsen's element it is quickly formed and very adherent. When polished, it has a shade intermediate between those of antimony and oxidized silver. It is not altered in dry air.

Antimony separates well from its double chloride with ammonium, at ordinary temperatures. The deposit is black, and may be advantageously used to replace platinum. When deposited from the chloride by a weak current on a fragment of antimony, the metallic layer has very curious explosive properties.

Palladium may be deposited from a perfectly neutral solution of palladium-ammonium chloride.—*Jour. Chem. Soc.*, Feb., from *Compt rend.*

New Test for Acids and Alkalis.—F. Frébault uses potassium and sodium picramates, which have a bright red color, and turn greenish-yellow when treated with the weakest acids. Filter-paper soaked in a solution of calcium picramate may be used for the same purpose, and may advantageously replace litmus.—*Ibid.*, Mar., from *J. Chim. Pharm.*

Method of Testing for Impurities in Potassium Iodide.—The novelty of Lepage's method consists in dissolving out all potassium iodide from the commercial sample with 80 per cent alcohol, and testing for the impurities,—carbonate, iodate, sulphate, chloride and bromide of potassium,—in the residue, by the ordinary processes.—*Ibid.* from *Ibid.*

Preparation of Iodic Acid.—When this acid is prepared by passing chlorine into water containing suspended iodine, twenty parts of water to 1 of iodine must be taken, in order to transform all the iodine into acid; otherwise chloride of iodine is formed.—G. Sodini. *Ibid.*, from *Gaz. Chem. ital.*

Precipitated Sulphur.—Instead of acting on polysulphide of calcium with pure hydrochloric acid, the commercial acid free from arsenic is used; the precipitate collected and washed is again mixed with acid, and left for about an hour, shaking from time to time; the grayish color then disappears suddenly; the acid is finally decanted, and used for a second operation.—M. Sansoni and C. Capellani. *Ibid.*, from *Ibid.*

Gelatin as a Reducing Agent.—On adding an excess of mercuric chloride to a solution of gelatin acidulated with hydrochloric acid, a flocculent precipitate is produced, which soon agglutinates and sinks to the bottom of the vessel as a dense layer. This swells up in pure water to a transparent jelly, which subsequently dis-

solves. On adding potassium hydrate to this solution and allowing it to stand, metallic mercury is precipitated in a finely divided state as a gray powder: the reduction is greatly facilitated by heating the liquid to 100°C. The solution of gelatin and mercuric chloride, when allowed to stand for a month or more, deposited mercurous chloride. On adding potassium hydrate to a solution of gelatin mixed with a little freshly precipitated mercuric oxide until the latter was dissolved, and then heating as before, metallic mercury was deposited in a finely divided state. The mercuric chloride can be completely separated from the gelatin by submitting a solution of the precipitate to dialysis.—G. Bizio. *Ibid.*, from *Ibid.*

Packing Paper.—Packing paper may be made water-tight by dissolving 1·82 pound of white soap in one quart of water, and dissolving in another quart 1·82 ounce (apothecaries' weight) of gum arabic, and 5·5 ounces of glue. The two solutions are to be mixed and warmed, the paper soaked in the mixture, and passed between rollers or hung up to dry.—*Jour. Frankl. Inst.*, Aug., from *Fortschr der Zeit.*

A New Washing Fluid.—Beat 1 kilogram of soap, with a little water, into a paste, warm it moderately, and incorporate it, by thorough stirring, into 45 liters of water at a temperature of about 30°C. (86°F.), to which 1 tablespoonful of oil of turpentine and 2 tablespoonfuls of ammonia have been added. The articles to be washed are to be soaked in this mixture for two hours, and then washed as usual. The fluid can be rewarmed and used a second time, by adding more turpentine and ammonia. The process is said to be time-, labor- and money saving, much less soap and rubbing being needed, and the wear of the clothes is greatly diminished — *Jour. Frankl. Inst.*, Aug., from *Neueste Erfind. u. Erfabr.*

Phosphate of Berberina.—Dr. T. L. A. Greve writes to the "Eclec. Med. Jour.," July, as follows: The alkaloid berberina may be prepared by the action of caustic baryta on the sulphate, or of oxide of silver on the muriate of berberina. The details of the necessary operations will be readily understood by any competent pharmacist. By saturating diluted phosphoric acid with this alkaloid, a solution of phosphate of berberina is obtained, which is, however, more readily made from the sulphate by boiling with water and precipitated phosphate of lime, when sulphate of lime and phosphate of berberina are formed. By filtering the solution of the latter, evaporating to dryness, redissolving in alcohol, filtering, and again evaporating, it may be freed from a small quantity of sulphate of lime. The above process may be varied by substituting phosphate of lead or phosphate of baryta for the lime salt. From the muriate of berberina the phosphate may be obtained by boiling in water with phosphate of silver, and redissolving in alcohol, as in the above process.

The Fluorescent Body in Atropa Belladonna.—This body, which is contained

in all parts of the plant, is distinguished by its strong fluorescence and stability, as shown by the following experiment: Two unripe berries were crushed with a little water, the mass dried on a water bath, the residue exhausted with alcohol, the solution again evaporated, and the remainder dissolved in water. The filtered solution was shaken at a gentle heat with animal charcoal, which takes up the compound. On then digesting it with alcohol and a little ammonia, a liquid is obtained showing a beautiful blue fluorescence, even if very dilute. The solution may be evaporated repeatedly without the compound losing in fluorescence, which reappears on the addition of ammonia.—R. Fassbender. *Jour. Chem. Soc.*, Feb., from *Deut. Chem. Ges. Ber.*

Eosin.—A. Baeyer has given certain additional particulars as to the manufacture of eosin. Fluorescein is obtained by heating 5 parts of anhydrous phthalic acid to 200° along with 7 parts of resorcin. The mass swells up and solidifies in the course of three to six hours. Fluorescein is extracted from this crude product by boiling with alcohol. It is a feeble acid, and dyes silk and wool a fast yellow with a reddish cast. For the preparation of eosin the fluorescein is suspended in 4 parts of glacial acetic acid and solution of bromine in glacial acetic acid, containing 20 per cent. of the former, is added. Tetrabrom-fluorescein (eosin) separates out in red crystals.—*Chem News*, July 13, 1877.

Origin of Petroleum.—Mr. H. Byasson has been led by the following experiment to give a scientific explanation of the formation of petroleum: If a mixture of vapor of water, carbonic acid and sulphuretted hydrogen be made to act upon iron heated to a white heat in an iron tube, a certain quantity of liquid carburets will be formed. This mixture of carburets is comparable to petroleum. The formation of petroleum can thus be naturally explained by the action of chemical forces. The water of the sea, penetrating into the cavity of the terrestrial crust, carries with it numerous materials, and especially marine limestone. If the subterranean cavity permits these new products to penetrate to a depth where the temperature is sufficiently high, in contact with metallic substances, such as iron or its sulphurets, we have a formation of carburets. These bodies will form part of the gases whose expansive force causes earthquakes, volcanic eruptions, etc. Petroleum is always found in the neighborhood of volcanic regions or along mountain chains. In general it will be modified in its properties by causes acting after its formation, such as partial distillation, etc. Petroleum deposits will always be accompanied by salt water or rock-salt. Often, and especially where the deposit is among hard and compact rocks, it will be accompanied by gas, such as hydrogen, sulphuretted hydrogen, carbonic acid, etc.—*Jour. App. Sci.*, March, from *Revue Ind.*

Fermentation of Glycerin.—Redtenbacher found that when a mixture of glycerin, water and yeast ferments, it yields acetic and propionic acids, and Berthelot obtained alcohol by fermenting a solution of glycerin with chalk and casein.

A. Fitz obtained quite different results by using a mixture of 2,000 water, 100 glycerin, 1 potassium phosphate, 0·5 magnesium sulphate, 2 German pepsin, and 20 chalk, to which was added a trace of a schizomyceta, which will be described in a future communication. At a temperature of 40° the liquid soon begins to ferment, carbon dioxide and hydrogen being given off, and the fermentation is finished in ten days. The solution then contains *normal butyl alcohol* and *normal butyric acid*, besides a little ethyl alcohol, and a higher acid, probably caproic. 100 parts of glycerin yielded 7·7 pure butyl alcohol and 12·3 anhydrous calcium butyrate.—*Jour. Chem. Soc.*, Feb., from *Deut. Chem. Ges. Ber.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

Cumberland County, Me., Pharmaceutical Society.—At a meeting held July 27, Dr. H. T. Cummings read a lengthy and interesting paper on *dangerous cosmetics*, dwelling especially on the freckle lotions, which usually are strong solutions of corrosive sublimate or of lead salts; on the so-called hair restorers, which usually contain lead, and on the enamels, pearl powders and similar cosmetics consisting not unfrequently of bismuth compounds, lead carbonate and white precipitate. Regarding the trade in these articles the lecturer said:

> Now in view of this fact that perfumers and cosmetic tinkers are liable to put death in the pot of cold cream or the jug of lotion, what is the duty of the pharmacist? There are but two alternatives that I can see, the one to refuse all agency in the sale of such compounds; and the other, if their patrons insist on having them, to let the purchaser take them on his or her own responsibility—but never by word or act to recommend them. It seems to me that those who scatter these deleterious preparations round so freely, and expose the public generally, and the fair sex especially, to such dangers, ought to be made amenable to the provisions of the law regulating the sale of poisons. Experience, as has been amply proved from what has already been said, has attested to the dangers incurred in the use of these poisonous preparations, and it is too late for most people to plead ignorance on this point; but if through cupidity they persist in being the agents of their distribution, after having been fully informed upon this matter, then they should be regarded as public enemies.

The new School of Pharmacy at Paris, which is now being erected in a part of the Luxembourg gardens, will occupy a space of 17,000 square meters, or somewhat more than four acres. In front of the building will be a grand court, 57 meters long, and ornamented with grass plots and with the statues of Parmentier and Vauquelin; at both ends will be two pavilions, containing the laboratories of the professors. The principal building will have a central vestibule, and contain the necessary offices, library and two lecture rooms, each of which will be 480 square meters, and accommodate 600 students. In the rear of the main building will be the gardens and green-houses, and a building 90 meters long and three stories high, intended to afford laboratory instruction to 600 pupils. The building will be erected over the catacombs, due precautions being taken to guard against accidents, and will probably be completed in 1880.

EDITORIAL DEPARTMENT.

Fraudulent, Proprietary and Semi-proprietary Medicines.—The traffic in the classes of medicines mentioned in the heading is among the greatest evils from which both the medical and pharmaceutical professions suffer. It is true that *frauds*, be they practised in the form of adulterations or actual substitutions, are usually short lived; yet even after they have been exposed, it is necessary to be constantly on the alert, because they are occasionally repeated by unprincipled dealers, and such repetition is again likely to succeed for a while, and the better the nearer the physical properties of the imitation approach those of the genuine article. In principle such frauds have no hold upon the community at large, nor upon the medical and pharmaceutical professions in particular; but in practice it is often different, and they are aided and abetted by those, who, in their morbid desire of purchasing *cheap*, overlook the *quality* as being of primary considerations; it is not want of honesty, but want of vigilance or of information, and in most cases, we think, the latter, which is to blame for the success of the fraudulent adulterator. There are many ill-informed apothecaries in large and small towns, and many medical practitioners, who, though being their own dispensers, cannot be expected to be the best judges of the quality of drugs, through whom the fraudulent medicines find their way to the consumer. An illustration of this state of things was furnished us by the frank confession of a man, who, some 20 or 25 years ago was a pedler, and who operated as follows: he purchased from one of our manufacturing chemists a quantity of sulphate of quinia in 1 oz. bottles and from another a corresponding quantity of salicin in bulk; the bottles were carefully opened, emptied and again filled with salicin, the quinia in bulk was sold in the city without difficulty, at a small loss, and the salicin in bottles was disposed of at the price of quinia to country physicians and storekeepers. The great fraud set on foot by a former drug firm of New York, a few years ago, will be fresh in the memory of our readers; we have it from persons who had the opportunity of obtaining the information, that the muriate of cinchonia, then sold as Pelletier's quinia, found its way almost altogether into the hands of country physicians and storekeepers, until the last of it was finally manufactured into sugar-coated quinine pills, which have undoubtedly been consumed as such by this time.

Proprietary Medicines, or secret preparations, properly so called, it is assumed are not prescribed by physicians; yet few pharmacists of experience will be found who cannot recall instances where such have been ordered in prescriptions. Inefficacy cannot be argued against many of these nostrums; the intelligent opposition against them is based upon the secrecy of their composition and the impossibility of devising general remedies for special cases, or for a number of diseases. The former stamps them with suspicion and as extortionate, the latter as hurtful, and consequently worse than worthless. In modern times they occupy the same position as did the arcana of former centuries, some of which, deprived of their cloak of se-

cresy, are even used at the present time. We do not apprehend that any of the nostrums of the present day will carry the names of their originators to an admiring posterity, not even the Warburg's tincture which has recently acquired so much notoriety, and which claims to have revived one of the fairest representatives of polypharmacy (see page 383) after a century's peaceful slumber; a resurrection requiring a firm faith, to be regarded as having produced more than the spectre of its former self.

Fraudulent medicines may be exposed and nostrums denounced as both should be; but a class of preparations has gradually gained a foothold which differ from those of the other two classes and yet frequently resemble the one or the other. We refer to what we regard as *semi-proprietary medicines*, which are often erroneously, in our opinion, called *specialties*. A physician may devote himself specially to diseases of the eye or ear, etc., and yet he has no secret, save the expertness which is the reward of his special devotion. It is, or rather it should be, similar in pharmacy. The manufacture of many medicinal chemicals, which formerly was one of the most important branches of pharmacy, has been transferred to the specialist, because the continued attention given to the complicated processes has necessarily made him a greater expert than the apothecary can hope to be by using such a process but once in a while; yet the processes are well-known by which the same results are obtainable. We can understand that one may have special facilities for the powdering of drugs, for preparing medicinal extracts, for the coating of pills, etc., and that such and similar articles be prepared as specialties by pharmacists or druggists with the view of supplying others. But with the manufacture of pseudo-chemicals and the host of so-called elegant preparations we at once enter upon dangerous ground.

It should never be left out of view that pharmacy is, and should be, no less a liberal profession than medicine, and that, from an ethical standpoint, a pharmacist has as little right to secrecy, or to take advantage of his observations, as the physician; the natural advantage given by greater expertness in any special direction cannot fail to be secured for him.

We are aware that the covetousness and indolence of many pharmacists have materially aided in bringing about the state of things under which medicine suffers no less than pharmacy; indolence, because they purchased galenics which they could have made themselves; covetousness, because in purchasing they have acted as though purchasing cheap was of greater importance than regard for quality. The physician has a right and it is his duty to insist upon getting every thing of prime quality and of the officinal standard; but we question his right of directing the pharmacist to purchase such articles which he can prepare himself, or to buy the products of certain manufacturers. In its beginning, the practice, though injudicious, was perhaps justifiable, but it has gradually extended so that it is no longer confined to officinal preparations, but embraces a large number of articles of which neither physicians nor pharmacists know anything save what the originators choose to tell them. Such information is usually given with an appearance of frankness, which on closer analysis is often found either to be so meagre as to scarcely differ from the assertions accompanying the ordinary nostrums, or so ambiguous and mis-

leading that it is difficult to draw the line of demarcation between them and the fraudulent substitutions and adulterations. It is for these reasons that we regard them as exerting a far more dangerous effect upon both medicine and pharmacy than the actual frauds or nostrums to which they are often so closely related. In prescribing them, physicians should remember that they have no definite knowledge of the composition of these articles, and that with very few exceptions, the information imparted by the labels or circulars as to the composition differs in no way from the vague statements which could be found on the wrappers of the sarsaparillas, buchus and other nostrums, which at some time or other enjoyed great popularity; yet which conscientious physician would have prescribed them?

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Exposition Internationale de Philadelphie, 1876. *Rapport sur la Pharmacie par Achille Jonas, Pharmacien, Délégué du Gouvernement Belge à l'Exposition de Philadelphie.* Brussels, 1877. 8vo, pp. 186.

The official report before us, which was rendered to the government of Belgium by Mr. A. Jonas, gives a pretty accurate and well-digested account of the pharmaceutical exhibits at the late International Exposition, as they appeared during the first two months. But after the departure of the author from Philadelphia several important collections of materia medica were to be found; notably was this the case with three Asiatic countries, China, Japan and the Philippine Islands, which the author had no occasion to see.

Die ältesten Heilmittel aus dem Orient. Von Professor Eduard Schaer. Schaffhausen, 1877. Pp. 24.

The ancient remedies from the orient.

This interesting and entertaining lecture was delivered at Zurich at the beginning of the scientific courses at the Swiss Polytechnicum, and gives interesting, chiefly historical, accounts of most of the important oriental drugs.

Quinquinas de Java. Par Mr. le professeur N. Gille, membre de l'académie royale de médicine. Anvers, 1877. Pp. 12.

The Cinchonas of Java.

We learn from this pamplet that, at the request of the Belgian authorities, the Dutch government very liberally supplied the Brussels school of veterinary medicine with a complete collection, representing the cinchona cultivation at Java; the report before us gives a brief account of the same, which Prof. Gille laid before the Royal Society of medical and natural sciences at Brussels. Those who have seen

the splendid cinchona exhibit of the Dutch Colonies at Fairmount Park, in 1876, can very well appreciate the scientific value of such a collection.

The Practitioner's Reference Book; adapted to the use of the Physician, the Pharmacist and the Student. By Richard J. Dunglison, M. D. Philadelphia: Lindsay & Blakiston, 1877. 8vo. 341. Price, cloth, $3.50.

After the Hippocratic oath, which is given as an introduction to the work, we find in the first division, headed "General Information for the Practitioner," a number of well arranged tables on weights and measures, solubilities of medicines, abbreviations in common use, and thermometric scales. When giving the number of drops in a fluidrachm, the author very properly calls attention to the uncertainty of thus measuring doses. We should have been still more pleased if he had gone a step farther, and advocated the discontinuance of the practice. The table of solubilities has been prepared with great care, and we have noticed few omissions or statements requiring particular corrections. Yellow and red oxide of mercury are practically insoluble in water; Wallace gives the solubility of the former as 1 in 200,000 parts of water, and Bineau that of both varieties as 1 in 20,000 parts. The mercuric iodide, reported as being insoluble, dissolves, according to Wurtz, in 150 parts, and the green iodide, according to Saladin, in 2,375 parts of water.

The other three divisions of the work are entitled: "Therapeutic and Practical Hints," "Dietetic Rules and Precepts" and "How to conduct a Post-mortem Examination." They are chiefly useful to the physician, but some portions of it are also of importance to pharmacists, particularly the very complete posological tables. The table of maximum doses, we think, will be very welcome to physicians and pharmacists; it is based on that of the German Pharmacopœia, and gives the maximum single and daily doses for adults of nearly all poisonous medicines commonly prescribed, both in apothecaries' and metric weights.

The list of incompatibles is very full, but as such tables necessarily must be, it cannot be expected to give information in all possible cases, and in some others the information given is vague; among the latter we class the sweeping statement that nitrate of silver is incompatible with salts of copper, while it is well known that the two metals may exist in solution together.

The work has been prepared with commendable judgment and care, and the publishers have spared nothing to present it in a durable and attractive style, which must enhance its practical usefulness.

The American Medical Association and the U. S. Pharmacopœia. Brooklyn, 1877. 8vo, pp. 157.

This is a reprint of the carious pamphlets which have appeared during the past year and to which we have referred on previous occasions; in addition thereto it contains the rejoinder to these papers, addressed by Dr. E. R. Squibb to the American Medical Association. It fairly represents the arguments advanced by both sides, and will be of value to those who feel interested in the subject, and who may obtain it free of cost by applying to Dr. Squibb. We may be permitted to state in

this connection that, after reading Dr. Squibb's rejoinder, we have failed to be convinced of the wisdom of his plan; on the other hand, we are, and have been for some years past, convinced of the necessity of a reform in the manner of revising the Pharmacopœia, and we believe that that can be successfully accomplished by the National Convention.

Annual Report of the Entomological Society of the Province of Ontario, for the year 1876. Printed by order of the Legislative Assemby. Toronto, 1877. 8vo, pp. 58.

The report contains, besides an account of the proceedings of the Society, various illustrated papers on blistering beetles, locusts, moths, beneficial and injurious insects.

Dose and Price Labels of the Principal Articles of the Materia Medica, and Preparations used in the United States. By C. L. Lochman. Allentown, Pa., 1877.

The labels are intended not to replace the ordinary shop labels, but in addition to such to be affixed to the bottles and drawers, and to serve as a ready reference in regard to doses and uses. Dangerous medicines are intended to be indicated by two heavy black lines and one or more exclamation marks (!). In this there are, however, some notable oversights: the poisonous nature of Tinct. opii deodorata, which is of the same strength as Tr. opii, is not marked; we should prefer to place chloral among the poisons; if dilute nitric and muriatic acids are poisonous, we should think that dilute sulphuric acid ought to be placed in the same class, etc.

Most of the labels, in which typographical errors occur, have been replaced by others, which are stitched in at the end of the book. The use which at present can be made of a label for *Rheum Russicum* is unknown to us.

The title-page states that a patent has been applied for; but we confess to our ignorance as to what there is *patentable* in the work, which is somewhat similar to the more complete label book published some years ago by Mr. George Barber, of Liverpool, with the addition of the black lines and exclamation marks, to indicate poisons, which we can hardly believe will be claimed as an invention.

Beiträge zur Chemie der wichtigeren Harze, Gummiharze und Balsame. Von Eduard Hirschsohn. St. Petersburg, 1877. 8vo, pp. 48.

Contributions to the chemistry of the more important resins, gum resins and balsams.

The experiments for these valuable "contributions" were made in Dragendorff's laboratory. We regret that we cannot make room for the entire dissertation, but expect to give a brief account of the reactions.

On the Physiology of Sugar in relation to the Blood. By F. W. Pavy, M.D., F.R.S. London, 1877. 8vo, pp. 15.

The pamphlet is a reprint from the "Medical Examiner" of two communications to the Royal Society, in the first of which the author describes his method

of accurately determining the amount of sugar by weighing the metallic copper obtained from the cuprous oxide by galvanic action. In the second paper sugar determinations of the blood of the dog, sheep and bullock are given, the mean of six or seven assays being ·787, ·521 and ·543 respectively per one thousand parts. The venous and arterial blood of the same animal was found nott o differ materially in the amount of sugar. After death the sugar disappeared spontaneously from the blood.

Milwaukee Souvenir. 1877. 8vo, pp. 76.

An illustrated pamphlet in the German language, giving a condensed history of the foundation and industrial and commercial importance of *the cream-colored city*, so called from the light color of the bricks used in building. Up to 1835 a single white family lived here; at present the population is estimated to exceed 120,000 inhabitants. During the two months commencing with June 5 last the conventions of not less than seven national and state associations were held here.

OBITUARY.

PROFESSOR AUGUST HUSEMANN, PH.D., died in Thusis, Switzerland, July 17, in the forty-fourth year of his age. At the age of fifteen he entered a pharmacy at Detmold as an apprentice, studied afterwards at Göttingen, and after having passed the state's examination, devoted himself to chemistry, and in 1860 received the degree of Ph.D. He investigated carotin and hydrocarotin, the ethers of sulphocarbonic and oxysulphocarbonic acids, the reactions of morphia and narcotina, and together with Marmé discovered lycina, cytisina and laburnina, also helleborin and helleborein, and proved the identity of lycina with betaina. Together with Th. Husemann, he published a work on toxicology and subsequently one on the proximate vegetable principles in their chemical, physiological, pharmacological and toxicological relations. Two supplementary volumes to Gmelin's Organic Chemistry were written in part by him; he was also actively engaged at Wigger's annual report on the progress of pharmacy since 1866 until Prof. Dragendorff became its editor in 1875. For a time he was private lecturer (privat docent) at the University of Göttingen, and afterwards accepted a call to the chair of chemistry and physics at the polytechnic school of Chur, where he remained until 1876, when failing health compelled him to resign his position.

GEORGE W. AIMAR, of Charleston, S. C., died in that city in the fiftieth year of his age. He learned the apothecary business at Beaufort, S. C., and afterwards removed to Charleston, graduated at the Medical College of South Carolina, and entered into business on his own account in 1853. He took an active interest in raising the status of pharmacy in his native State.